

AD-A143 492

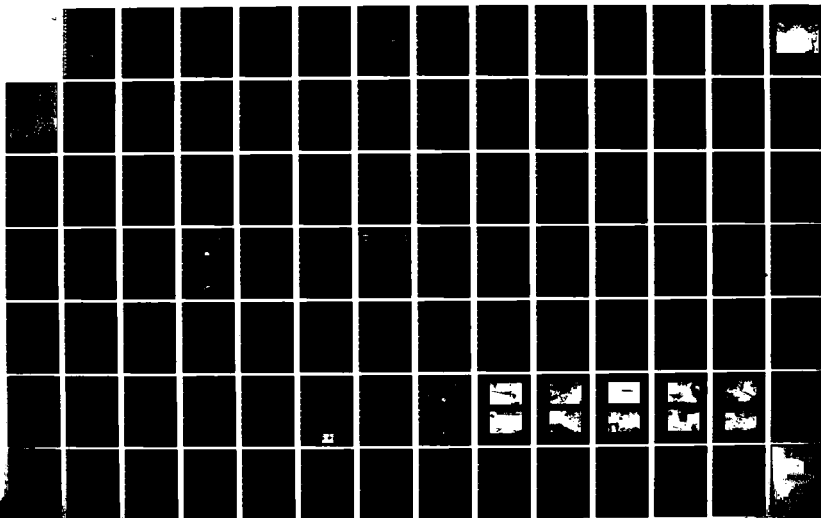
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
PATAGUANSET LAKE DAM (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV JUN 81

1/1

UNCLASSIFIED

F/G 13/13

NL



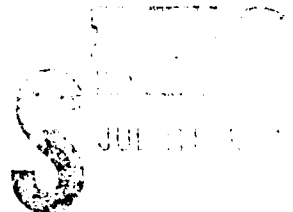
CONNECTICUT COASTAL BASIN
EAST LYME , CONNECTICUT

AD-A143 492

PATAGUANSET LAKE DAM
CT. 00159

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

COPIES COPY



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JUNE 1981

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00159	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Pataguanset Lake Dam		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE June 1981
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES 65
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Conn. Coastal Basin East Lyme, Conn. Pataguanset Lake Dam		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Pataguanset Lake Dam is a 210 ft. long earthfill and stone masonry structure. The dam is classified as SMALL in size and a SIGNIFICANT hazard structure in accordance with recommended guidelines established by the Corps of Engineers. Based on the size and ahzard classifications, the adopted test flood for this structure is equal to one-half the PMF. Based on visual inspection at the site, the dam is considered to be in FAIR condition.		



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

AUG 21 1981

Honorable William A. O'Neill
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

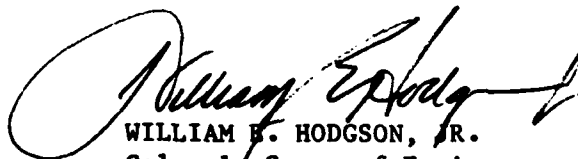
Dear Governor O'Neill:

Inclosed is a copy of the Pataguanset Lake Dam (CT-00159) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is vitally important.

Copies of this report have been forwarded to the Department of Environmental Protection. Copies will be available to the public in thirty days.

I wish to thank you and the Department of Environmental Protection for your cooperation in this program.

Sincerely,



WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Commander and Acting Division Engineer

Incl
as stated

Accession For	
NTIS GRA&I	X
DTIC TAB	
Unannounced	
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A/1	

PATAGUANSET LAKE DAM

CT 00159



CONNECTICUT COASTAL BASIN

EAST LYME, CONNECTICUT

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION REPORT

PHASE 1 INSPECTION REPORT

IDENTIFICATION NO: CT 00159
NAME OF DAM: Pataguanset Lake Dam
COUNTY AND STATE: New London County,
Connecticut
STREAM: Pataguanset River
DATE OF INSPECTION: 20 May 1981

Brief Assessment

Pataguanset Lake Dam is a 210 foot long earthfill and stone masonry structure. The left half of the dam is an earth embankment with a 10 foot crest width and a crest elevation of 68.0 NGVD. The center section of the dam is an earthfill emergency spillway with sheet piling on the upstream face and a 20 foot wide concrete paved crest. The crest elevation of this section is 65.2 NGVD. The spillway is a broadcrested weir, 15 feet long, with a crest elevation 62.7 NGVD. The outlet consists of a 6 foot wide rectangular concrete channel with stop log controls and an invert of 60.2 NGVD. The maximum height of the dam is 11.6 feet. The dam has a maximum impoundment capacity of 950 acre-feet at the top of dam elevation of 68.0 NGVD and is used for recreation.

The dam is classified as SMALL in size and a SIGNIFICANT hazard structure in accordance with recommended guidelines established by the Corps of Engineers. Based on the size and hazard classifications, the adopted test flood for this structure is equal to one-half the Probable Maximum Flood (PMF) as modified for basin storage. This is estimated to be 830 CSM, or 3,000 CFS, from the 3.6 square mile drainage basin. The test flood has a routed outflow discharge equal to 1,800 CFS and would overtop the dam by 0.3 feet. The maximum spillway, outlet, and emergency spillway capacity is equal to 1,580 CFS which represents 88% of the test flood outflow.

Based on a visual inspection at the site, the dam is considered to be in FAIR condition. It is recommended that the left training wall of the outlet channel be repaired or replaced immediately upon receipt of this report.

It is also recommended that the owner engage the services of a registered engineer experienced in the design of dams to accomplish the following:

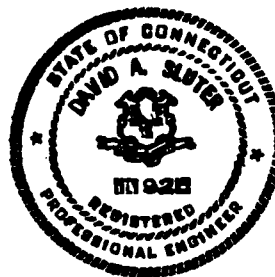
1. Perform a detailed hydrologic/hydraulic investigation to assess further the need for and the means to increase project discharge capacity and the ability of the dam and emergency spillway to withstand overtopping.
2. Investigate the need for riprap protection on the downstream side of the emergency spillway.
3. Design and supervise repairs to the embankment to the left of spillway and to the abutment to the right of outlet channel. Restore these areas to their full cross section and to the full height of the dam.
4. Provide procedures for removal of brush, trees and root systems, for filling holes with compacted soil, and erosion control measures.

These and other recommendations and remedial measures as described in Section 7 should be implemented by the owner within one year after receipt of this Phase 1 Inspection Report.

NEW ENGLAND ENGINEERING, INC.

By:

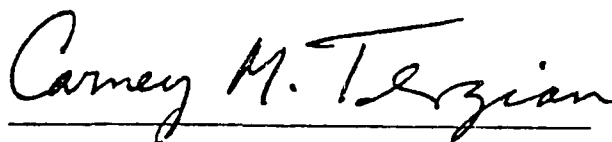

David A. Sluter, P.E.
President



This Phase I Inspection Report on Pataguanset Lake Dam (CT-00159) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.



ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

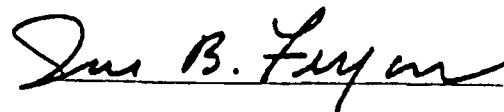


CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division



JOSEPH W. FINEGAN, JR., CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:



JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase 1 Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, DC 20314. The purpose of a Phase 1 Investigation is to identify expeditiously those dams which may pose hazards to human life or to property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase 1 investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase 1 inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonable possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

The Phase 1 Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
LETTER OF TRANSMITTAL	
BRIEF ASSESSMENT	
REVIEW BOARD PAGE	
PREFACE	i
TABLE OF CONTENTS	ii
OVERVIEW PHOTO	
LOCATION MAP	

REPORT

1. PROJECT INFORMATION	1-1
1.1 General	1-1
a. Authority	1-1
b. Purpose of Inspection	1-1
1.2 Description of Project	1-1
a. Location	1-1
b. Description of the Dam & Appurtenances	1-2
c. Size Classification	1-2
d. Hazard Classification	1-2
e. Ownership	1-3
f. Operator	1-3
g. Purpose of the Dam	1-3
h. Design and Construction History	1-3
i. Normal Operational Procedures	1-3
1.3 Pertinent Data	1-4
a. Drainage Area	1-4
b. Discharge at Damsite	1-4
c. Elevations	1-5
d. Reservoir Lengths	1-5
e. Storage	1-5
f. Reservoir Surface Area	1-6
g. Dam	1-6
h. Diversion and Regulating Tunnels	1-6
i. Spillway	1-7
j. Regulating Outlets	1-7

<u>Section</u>	<u>Page</u>
2. ENGINEERING DATA	2-1
2.1 Design Data	2-1
2.2 Construction Data	2-1
2.3 Operation Data	2-1
2.4 Evaluation of Data	2-1
a. Availability	2-1
b. Adequacy	2-1
c. Validity	2-1
3. VISUAL INSPECTION	3-1
3.1 Findings	3-1
a. General	3-1
b. Dam	3-1
c. Appurtenant Structures	3-2
d. Reservoir Area	3-3
e. Downstream Channel	3-3
3.2 Evaluation	3-3
4. OPERATIONAL PROCEDURES	4-1
4.1 Operational Procedures	4-1
a. General	4-1
b. Description of any Warning System in Effect	4-1
4.2 Maintenance Procedures	4-1
a. General	4-1
b. Operating Facilities	4-1
4.3 Evaluation	4-1
5. EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES	5-1
5.1 General	5-1
5.2 Design Data	5-1
5.3 Experience Data	5-1
5.4 Test Flood Analysis	5-1
5.5 Dam Failure Analysis	5-2

<u>Section</u>	<u>Page</u>
6. EVALUATION OF STRUCTURAL STABILITY	6-1
6.1 Visual Observations	6-1
6.2 Design & Construction Data	6-1
6.3 Post-Construction Changes	6-1
6.4 Seismic Stability	6-1
7. ASSESSMENT RECOMMENDATION & REMEDIAL MEASURES	7-1
7.1 Dam Assessment	7-1
a. Condition	7-1
b. Adequacy of Information	7-1
c. Urgency	7-1
7.2 Recommendations	7-1
7.3 Remedial Measures	7-2
a. Operation & Maintenance Procedures	7-2
7.4 Alternatives	7-2

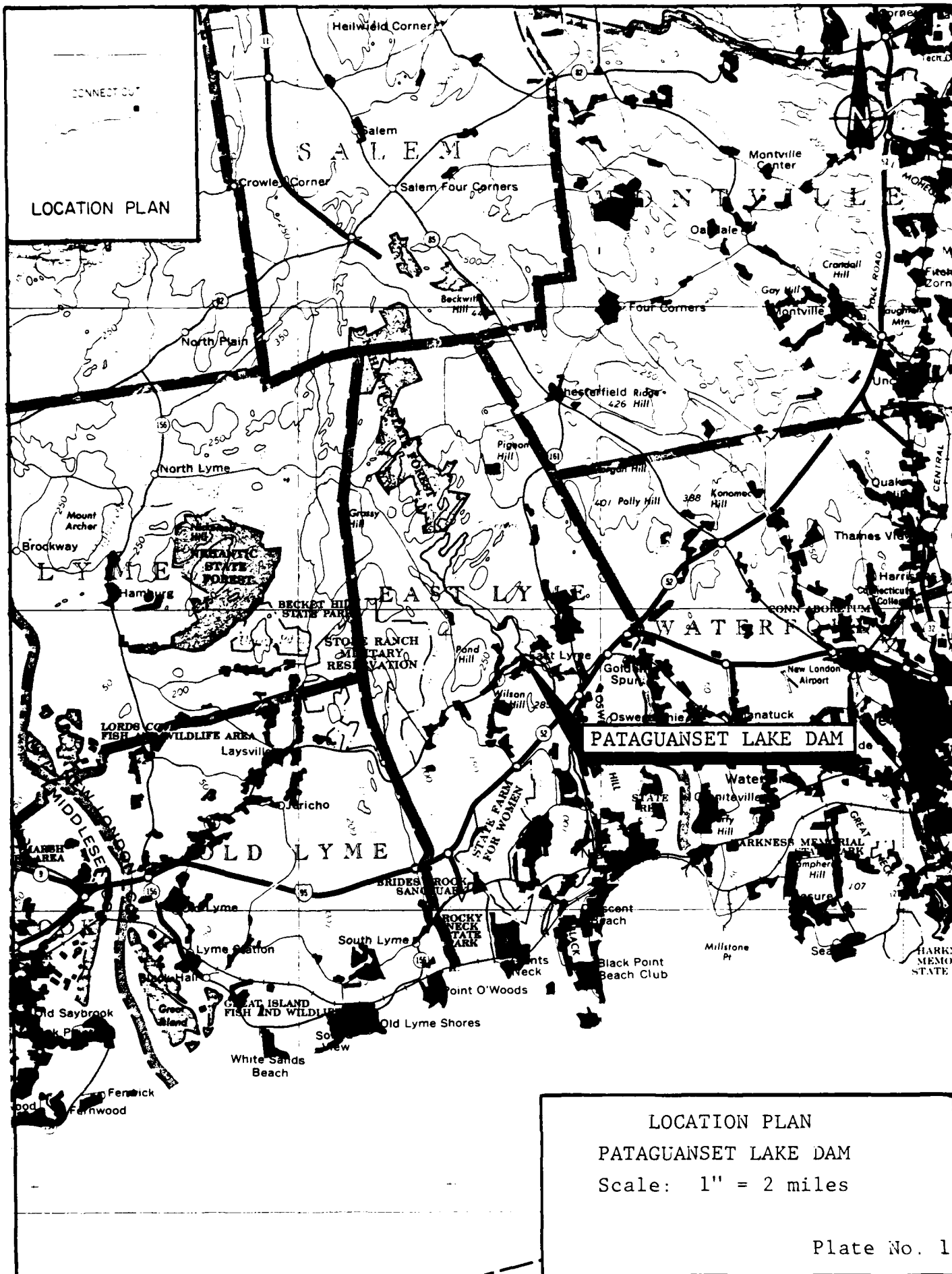
APPENDICES

APPENDIX A	INSPECTION CHECKLIST
APPENDIX B	ENGINEERING DATA
APPENDIX C	PHOTOGRAPHS
APPENDIX D	HYDROLOGIC & HYDRAULIC COMPUTATIONS
APPENDIX E	INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS



OVERVIEW PHOTO - Pataguanset Lake Dam

May 20, 1981



NATIONAL DAM INSPECTION PROGRAM

PHASE 1 - INSPECTION PROGRAM

PATAGUANSET LAKE DAM

SECTION 1

PROJECT INFORMATION

1.1 General

- a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. New England Engineering, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to New England Engineering, Inc. under a letter from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-81-C-0007 has been assigned by the Corps of Engineers for this work.
- b. Purpose of Inspection.
 1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.
 2. Encourage and assist the State to initiate quickly effective dam safety programs for non-Federal dams.
 3. To update, verify, and complete the National Inventory of Dams.

1.2 Description of the Project

- a. Location. Pataguanset Lake Dam is located in the Town of East Lyme, in New London County, Connecticut on the Pataguanset River, approximately 5 miles upstream from the mouth of the river at Long Island Sound. Coordinates of the dam are approximately 41 degrees, 22.2' North Latitude and 72 degrees, 13.4' West Longitude as shown on the Niantic, CT, USGS Quadrangle Sheet. The dam impounds water from the Pataguanset River which drains a 3.6 square mile watershed of hilly, wooded terrain. The axis of the dam is oriented in a North-South direction with the impoundment to the west.

- b. Description of Dam and Appurtances. Pataguanset Lake Dam is approximately 210 feet long including the spillway. The maximum height of the dam is 11.6 feet. The dam is an earthfill structure. Due to leakage that occurred in the past, the center section, about 70 feet long, of the earth dam was rehabilitated in 1942. Heavy sheet piles were driven, apparently to till, on the upstream side, and the crest was lowered 2.8 ft and capped with a one-ft-thick reinforced concrete pavement. This central section now acts as an emergency spillway and has a crest width of 20 feet. The downstream face of the emergency spillway and about 20 ft of the face to the left of the principal spillway is a dry masonry, vertical stone wall. The earth embankment section to the left of the principal spillway is 90 feet long with a crest width of 10 feet. The upstream and downstream slopes are 2H:1V and the elevation of the crest is 68.0 NGVD.

The principal spillway is located 90 feet from the left abutment and is concrete over the original masonry construction. The spillway width is 13.0 feet at the weir increasing to 15.0 feet one foot above the weir. The weir is broadcrested with a free overflow. The weir crest elevation is 62.7 NGVD. Near the right abutment is a six-foot wide concrete outlet channel that formerly fed water to the mills below the dam. The outlet discharge channel now joins the spillway discharge channel 70 feet downstream of the dam. Flow through the channel is controlled by stop logs at the upstream end.

- c. Size Classification. This dam has an impoundment capacity of 950 Ac-Ft at the top of the dam (elevation 68.0 NGVD) and a maximum height of 11.6 feet. In accordance with the guidelines established by the Corps of Engineers, this dam is classified as SMALL in size based on its impoundment capacity. Corps of Engineers guidelines specify that dams with impoundment capacities less than 1,000 Ac-Ft and greater than or equal to 50 Ac-Ft or a height of less than 40 feet and greater than or equal to 25 feet be classified as SMALL in size.
- d. Hazard Classification. This dam is classified a SIGNIFICANT hazard potential because its failure could result in a loss of a few lives and inundation of two homes downstream of the dam. It is estimated that a dam failure would result in a failure discharge of

The prefailure discharge of 1,580 CFS would produce flooding to a depth of 0-1 feet in the affected homes. The dam failure discharge was computed assuming the water level in the reservoir to be equal to the top of dam elevation of 68.0 NGVD at the time of failure. In addition, U.S. Route 1 located downstream of the dam would be subject to flooding to a depth of 4 feet as a result of a dam failure. A 50 foot long propane gas storage tank is also located in the prime failure impact area approximately 500 feet downstream of the dam.

- e. Ownership. The dam is presently owned by the State of Connecticut.
- f. Operator. Maintenance and operation are the responsibility of the State of Connecticut, Department of Environmental Protection:

Mr. John Spencer
Area Manager
Region 3 Headquarters
Connecticut Dept. of
Environmental Protection
Marlborough, CT 06447
(203) 295-9523

- g. Purpose of Dam. The dam was formerly used to provide power and process water for mills downstream. It is presently used for recreation purposes.
- h. Design and Construction History. There are no available records on the history of the dam prior to 1942 except to note that the State of Connecticut purchased the dam in 1936. It is estimated that the original dam was built in the late 1800's to provide power and water to mills located there.

In 1942, the center portion of the dam was repaired by driving steel sheet piling along the upstream face and rebuilding the crest and outlet works with reinforced concrete. In 1967 the discharge channel from the outlet works was relocated to join the main stream 70 feet below the dam. Plans and correspondence further describing these repair projects are included in Appendix B.

- i. Normal Operating Procedures. The level of the reservoir is not normally controlled and is maintained at the top of the stop logs at the outlet.

1.3 Pertinent Data

- a. Drainage Area. The Pataguanset Lake Dam drainage basin is generally rectangular in shape with an average length of approximately 4 miles, a width of 1 mile and a total drainage area of 3.6 square miles (See Appendix D for the basin map). Approximately 15% of the basin is man-made or natural storage. The topography consists of rolling terrain with elevations ranging from a high of 353 feet to 63 feet at the spillway crest. Basin slopes are considered moderate to steep.
- b. Discharge at Damsite. There are no discharge records available for this dam. Calculated discharge data for the dam is listed below.

1. Outlet Works

Conduit & Size	6 foot wide concrete channel, stop log control upstream, invert = 60.2 feet NGVD. Top of stop logs = 62.8.
----------------	--

Discharge Capacity with reservoir at spillway crest elevation = 62.7	15 CFS
--	--------

Discharge Capacity with reservoir at top of dam elevation = 68.0	210 CFS
--	---------

Discharge Capacity at test flood elevation = 68.4	230 CFS
---	---------

2. Maximum known flood at damsite	Unknown
-----------------------------------	---------

3. Ungated spillway capacity (principal and emergency) at top of dam	1370 CFS
--	----------

4. Ungated spillway capacity (principal and emergency) at test flood elevation	1550 CFS
--	----------

5. Gated spillway capacity at normal pool elevation	N/A
---	-----

6. Gated spillway capacity at test flood elevation	N/A
--	-----

- | | | |
|----|--|-----------|
| 7. | Total spillway capacity
at test flood elevation | 1,550 CFS |
| 8. | Total project discharge
at top of dam | 1,580 CFS |
| 9. | Total project discharge
at test flood elevation | 1,860 CFS |

c. Elevations (NGVD)

- | | | |
|----|---------------------------------------|---------|
| 1. | Streambed at toe of dam | 56.4 |
| 2. | Bottom of cutoff | Unknown |
| 3. | Maximum tailwater | Unknown |
| 4. | Normal pool | 62.7 |
| 5. | Full flood control pool | N/A |
| 6. | Spillway crest | |
| | a. Principal | 62.7 |
| | b. Emergency | 65.2 |
| 7. | Design surcharge
(Original Design) | Unknown |
| 8. | Top of dam | 68.0 |
| 9. | Test flood | 68.3 |

d. Reservoir Lengths (in feet)

- | | | |
|----|---------------------|-------|
| 1. | Normal pool | 5,200 |
| 2. | Flood control pool | N/A |
| 3. | Spillway crest pool | 5,200 |
| 4. | Top of dam | 5,200 |
| 5. | Test flood pool | 5,200 |

e. Storage (acre-feet)

- | | | |
|----|---------------------|-----|
| 1. | Normal pool | 310 |
| 2. | Flood control pool | N/A |
| 3. | Spillway crest pool | 310 |
| 4. | Top of dam | 950 |
| 5. | Test flood pool | 990 |

f. Reservoir Surface Area (Acres)

1.	Normal pool	120
2.	Flood control pool	N/A
3.	Spillway crest	120
4.	Top of dam	120
5.	Test flood pool	120

g. Dam

1.	Type	Earth with sheet piling on U/S side & concrete paving on central section of crest.
2.	Length	210 feet
3.	Height	11.6 feet maximum
4.	Top width	
	a. Center Section	20 feet
	b. Earth Embankment	10 feet
5.	Side slopes	
	a. Center Section	Vertical
	b. Earth Embankment	U/S 2H:1V D/S 2H:1V
6.	Zoning	None
7.	Impervious Core	
	a. Center Section	Concrete & sheet piles U/S
	b. Embankment	None known
8.	Cutoff	
	a. Center Section	Sheet pile cutoff
	b. Embankment	None known
9.	Grout Curtain	Unknown
10.	Other	No comment

h. Diversion and Regulating Tunnel

N/A

i. Spillways

- | | | |
|----|-----------------|---|
| 1. | Type | Broadcrested weir |
| 2. | Length of weir | |
| | a. Principal | 13.0 feet for first foot
then it increases to 15.0
feet |
| | b. Emergency | 70 feet |
| 3. | Crest Elevation | |
| | a. Principal | 62.7 feet NGVD |
| | b. Emergency | 65.2 |
| 4. | Gates | None |
| 5. | U/S Channels | Natural bed of reservoir |
| 6. | D/S Channel | Natural stream bed |
| 7. | General | No comment |

j. Regulating Outlet

- | | | |
|----|-------------------|--|
| 1. | Invert | 60.2 feet |
| 2. | Size | 6 foot wide channel |
| 3. | Description | Concrete rectangular
channel |
| 4. | Control mechanism | Stop logs at U/S end
elevation = 62.8 feet NGVD |
| 5. | Other | No comment |

SECTION 2
ENGINEERING DATA

2.1. Design

There is no available documentation regarding the design of this facility.

2.2 Construction

No records of the original dam construction were found. Repair efforts since the 1940's are documented in the correspondence and inspection reports included in Appendix B of this report.

2.3 Operation

No operation records are maintained.

2.4 Evaluation

- a. Availability. There is no design information available.
- b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance and sound engineering judgement.
- c. Validity. No design data is available.

SECTION 3

VISUAL INSPECTION

3.1 Findings

- a. General. The Phase 1 visual inspection of the Pataguanset Lake Dam was conducted on May 20, 1981 by representatives of New England Engineering, Inc. and Geotechnical Engineers, Inc. A visual check-list and photographic record of that inspection have been included in Appendix A and C, respectively, of this report. At the time of the inspection, the water level was 0.3 feet above the spillway crest elevation of 62.7.

Based on the visual inspection, the dam is judged to be in FAIR condition.

- b. Dam. The dam is an earthfill structure, approximately 210 feet in length with a maximum height of 11.6 feet. The main or center section of the dam was rebuilt in 1942 by placing a steel sheet pile cutoff along the upstream face and reinforced concrete paving over the crest at an elevation 2.8 feet below the top of the dam. The section now acts as an emergency spillway and is treated as such in this report. The principal spillway, which is the original spillway for this dam, is located at center of the dam and 90 feet right of the left abutment. At the right abutment is an outlet channel which formerly fed water to the mill downstream. The section of the dam from the spillway to the left abutment is an earth embankment.
 1. Upstream Face. The upstream face of the emergency spillway consists of steel sheet piling to the water line and a vertical concrete wall extending 2 feet to the crest. Both the concrete and the sheet piling are in good condition (See Photo C-1). The upstream face of the embankment at the left side of the dam is an earthen slope covered with trees and brush. The embankment to the left of the spillway is protected by a 10 foot long concrete training wall.
 2. Crest. The crest of the emergency spillway is paved with reinforced concrete (Photo C-1 and C-2). Beneath the concrete is the original embankment. Frost action or other movements have caused the crest paving to crack due to differential movements. The vertical differential movement reaches a maximum of about 1 in. (Photo C-5). Brush is now taking root along the cracks, which will accelerate deterioration of the concrete.

The crest of the embankment section is earth and is covered with grass, trees and brush (Photo C-3). Erosion has occurred in the embankment adjacent to the left training wall of the spillway (Photo C-4). The crest of the embankment in this vicinity has been eroded to a nearly triangular cross section, such that the top width is only one or two feet. Future high water levels will continue the erosion and may eventually breach the crest.

On the right side of the outlet channel, which is the right abutment, the top of ground is about two feet below the top of the adjacent right training wall. This zone is not paved or satisfactorily grassed and is subject to continued erosion and possible overtopping.

3. Downstream Face and Toe. The downstream face of the emergency spillway (Photo C-2) is vertical dry stone masonry. On the left side of the principal spillway on the downstream face, deposits of sand were found in the large voids between the stones in the wall. These deposits may be caused by runoff from the embankment above or they may have developed during past high water stages. There is no evidence of filter material behind the dry masonry wall. This zone should be observed regularly, especially during heavy rains and high water levels, to determine whether repairs are needed. No seepage was noted on the downstream face or toe areas.

The downstream face of the embankment section is brush covered earth slope for most of its length. A 4 foot high wall extends from the spillway, 35 feet to the right. The wall is constructed of stone masonry with a concrete cap.

- c. Appurtenant Structures. Locations of the appurtenant structures are shown on the General Plan in Appendix B.

1. Spillways. The principal spillway is located approximately 100 feet right of the left abutment near the center of the dam. It is constructed of stone masonry with a concrete cap (Photo C-9). The right training wall is 2.5 feet high, constructed of stone masonry,

and in good condition. The left training wall is 5 feet high and constructed of stone masonry at the base and concrete above. The concrete section has a vertical crack from the stone masonry to the top of the wall. The emergency spillway near the center of the dam is 70 feet long and is a broadcrested weir. The crest is paved with concrete and the downstream face is dry stone masonry. There is no erosion protection at the toe along the downstream face.

2. Outlet Channel. The outlet channel is located at the right abutment. The channel is 6 feet wide and is controlled by 2 inch thick wooden stop logs at the upstream end (Photo C-6). The stop logs and slots are in fair condition. The channel training walls are concrete (Photo C-8). The right wall is in fair condition with some erosion along the water line. The left wall is spalled and eroded completely through along the base with reinforcing and the soil behind the wall exposed (Photo C-7).
- d. Reservoir Area. No specific detrimental features in the reservoir area were observed during the visual inspection.
- e. Downstream Channel. The downstream channel is natural streambed. The banks are unprotected earth and heavily overgrown with trees and brush which reduce the flow capacity of the channel.

3.2 Evaluation

Based on the visual inspection, the dam appears to be in FAIR condition. The following features could adversely affect the future performance of the dam and should be investigated or monitored:

- a. The need for erosion protection at the toe of the emergency spillway.
- b. The left training wall of the outlet channel should be repaired or replaced immediately upon receipt of this report.
- c. The crest paving of the emergency spillway is cracked and deterioration due to frost action and root growth is continuing. Regular observations should be made so that repairs can be made in a timely manner. The vegetation in the cracks should be removed and kept cut.

- d. Erosion of the embankment on the left side of the spillway appears to be continuing. This zone should be restored to its original cross section and protected from future erosion. Similarly, the right abutment should be raised to the same elevation as the crest of the embankment with a properly designed cross section and protected against erosion.
- e. The trees, brush, and root systems should be removed from the dam and to a distance of 15 feet downstream. Any resulting holes should be filled with properly compacted soils and protected against erosion.
- f. Observations of the downstream stone masonry face should be made regularly, during high water levels, and during heavy rainfall to determine whether any seepage occurs and whether repairs should be made.

SECTION 4

OPERATIONAL & MAINTENANCE PROCEDURES

4.1 Operational Procedures

- a. General. Pataguanset Lake is used by area residents as an recreational facility. Operational control is the responsibility of the Connecticut Department of Environmental Protection, Region 3. Normally, the outlet channel stop logs remain in place and the water level is maintained at the spillway height.
- b. Warning System. There is no warning system in effect at Pataguanset Lake Dam. There is no formalized emergency action plan for the dam.

4.2 Maintenance Procedures

- a. General. The dam and appurtenances are not maintained.
- b. Operating Facilities. The stop logs and slots for the outlet channel appear to be in operating order. The channel walls are badly deteriorated however, and repairs are required.

4.3 Evaluation

- a. There is no regularly scheduled maintenance for this dam. There are numerous maintenance deficiencies and a systematic inspection and rehabilitation program should be developed and implemented.
- b. Trees and brush are growing on the upstream face and crest of the earth embankment.
- c. Erosion of the crest of the left embankment and at the right abutment is occurring.
- d. An emergency action plan should also be developed and implemented that includes procedures to lower the reservoir level, locations of emergency equipment, materials or manpower to reduce or minimize dam failure damage, authorities to be contacted in emergency situations and a program of surveillance during unusual storm events.

SECTION 5

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

The Pataguanset Lake Dam was probably constructed in the late 1800's to supply water and power to mills just downstream. The dam was repaired in 1942 to correct a serious leakage problem. The dam is located on the Pataguanset River in the Connecticut Coastal Basin. The watershed for the reservoir is 3.6 square miles with approximately 15% of this basin man-made or natural storage.

The dam has a spillway length of 15 feet and a maximum height of 11.6 feet. The total length of the dam is 210 feet including the spillway. The reservoir has a storage capacity at the spillway crest of 310 Ac-Ft. Each foot of depth above the spillway level can accommodate 120 Ac-Ft of water equivalent to 0.62 inches of runoff.

5.2 Design Data

Little specific data is available for this watershed or structure. In lieu of existing complete design information, U.S.G.S. topographic maps (scale 1" = 2,000') were utilized to develop hydrologic parameters such as drainage area, reservoir surface areas, basin slopes and other runoff characteristics. Elevation-storage relationships for the reservoir were approximated. Some of the pertinent hydraulic data was obtained or confirmed by actual field measurements at the time of the visual inspection. Test flood inflows and outflows and dam failure flows were determined in accordance with the Corps of Engineers guidelines.

5.3 Experience Data

No historical data for recorded discharges is available for this dam.

5.4 Test Flood Analysis

Recommended guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for selection of the Test Flood. This dam is classified under those guidelines as a SIGNIFICANT hazard and SMALL in size. Guidelines indicate that a flood equal to a 100-year storm to one-half the PMF be used as a range of test floods for such a classification. A test flood equal to 1/2 the PMF was selected

because of the downstream hazard potential. The watershed has a total drainage area equal to 3.6 square miles of which approximately 15% is man-made or natural storage. This drainage area is sparsely populated, fairly wooded, with rolling to steep topography.

A test flood value was selected from the Corps of Engineers PMF curve for a watershed with rolling topography and reduced by 15% for storage within the watershed. The test flood inflow was calculated to be 830 CSM, equal to 3,000 CFS and was adopted for this analysis. The routed outflow discharge for the test flood inflow was 1,800 CFS. The spillway and outlet rating curves are illustrated in Appendix D. Flood routing was performed assuming a full reservoir at the spillway crest elevation of 62.7 NGVD and the outlet stoplogs in place at 62.9 NGVD.

The analysis indicated that the peak test flood outflow would overtop the dam by approximately 0.4 feet. The maximum outflow capacity of the principal spillway, outlet, and emergency spillway at the top of dam elevation 68.0 is 1,580 CFS or 88% of the test flood outflow.

5.5 Dam Failure Analysis

For this analysis a full-depth, partial-width breach was assumed to have occurred in this dam. A breach width of 35 feet was selected for the analysis based on the dam height and cross section. A dam failure discharge of 3,100 CFS was calculated assuming the reservoir level to be at the top of dam elevation 68.0. The dam failure discharge of 3,100 CFS includes a spillway discharge of 1,250 CFS. It is estimated that failure could result in the loss of a few lives and a flood wave with a depth of 8-9 feet. It is estimated that failure could result in the inundation of 2 homes located downstream of the dam to depths of 2 to 3 feet. The prefailure discharge of 1,580 CFS would result in 0 to 1 foot of flooding in those homes. The failure discharge would also produce a 4-foot water depth over the Boston Post Road (US Route 1) with subsequent possibilities of damage. A large propane gas storage tank is also located in the prime failure impact area approximately 500 feet downstream of the dam. This tank could be removed from its foundation and carried downstream in the event of a dam failure. The prime impact area that would be subject to damage if the dam were to fail has been delineated on the Dam Failure Impact Area Map in Appendix D. As a result of the failure analysis, the dam has been classified as a SIGNIFICANT hazard structure.

SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 Visual observations

Visual examination of the geotechnical and structural aspects of the dam indicated that the following features could affect the long-term stability of the dam.

- a. The complete erosion and deterioration of the left training wall of the outlet channel could allow erosion of material from the center of the dam. This wall requires immediate repair.
- b. Continued erosion of the embankment left of the spillway and erosion of the right abutment during high water could lead to a washout. These areas require repair, as noted in Section 3.

6.2 Design and Construction Data

No design or construction drawings or records for the original dam are available.

6.3 Post-Construction Changes

According to the correspondence and reports found and included in Appendix B, the concrete paving on the crest and upstream face and the row of sheet piles that now form the upstream face were added in 1942. These changes were made because extensive leakage through the embankment was noted previously between the spillway and the raceway outlet. These repairs were well done and are in good condition, except for the cracking of the crest paving, as noted in Section 3.

6.4 Seismic Stability

The dam is located in Seismic Zone 1 and, in accordance with recommended Phase 1 guidelines, does not warrant seismic stability analysis.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

- a. Condition. Based on the visual inspection, this dam is judged to be in FAIR condition. Features which could adversely affect the condition of the dam in the future are:
 1. Eroded sections at the right abutment and left of the principal spillway and the lack of erosion protection at the toe of the emergency spillway.
 2. Deteriorated left training wall of the outlet.
 3. Cracking of the concrete crest paving.
- b. Adequacy of Information. The available information is such that the assessment of the condition of the dam must be based on visual observation.
- c. Urgency. The recommendations for the repair of the left training wall of the outlet channel should be implemented immediately upon receipt of this report. The remaining recommendations and remedial measures described below should be implemented by the owner within one year after receipt of the Phase 1 report.

7.2 Recommendations

The following items should be carried out under the direction of a qualified registered engineer and recommendations resulting should be implemented by the owner.

- a. Repair or replace the left training wall of the outlet channel.
- b. Perform a detailed hydrologic/hydraulic investigation to assess further the need for and the means to increase project discharge capacity and the ability of the dam and emergency spillway to withstand overtopping.
- c. Design and install erosion protection along the toe of the emergency spillway.
- d. Design and supervise repairs to the eroded areas of the embankment to the left of the principal spillway and at the right abutment. These areas should be restored to their full cross sections and to the full height of the dam and erosion protection provided.

- e. Provide procedures for removal of brush, trees and root systems, and for filling any resulting holes with compacted soil. Remove brush and trees and their root systems from all surfaces of the dam and to 15 feet downstream of the toe.
- f. Observe the downstream face during high water and during heavy rainfall to determine whether seepage is occurring and whether repairs are necessary.

7.3 Remedial Measures

a. Operation and Maintenance Procedures

- 1. Develop an "Emergency Action Plan" that will include an effective preplanned downstream warning system, locations of emergency equipment, materials and manpower, authorities to contact and potential areas that require evacuation.
- 2. Implement a regular maintenance program for the facility.
- 3. Institute a program of annual technical inspection by a qualified registered engineer.
- 4. Observe the pavement on the crest at least annually to determine whether deterioration or movement are occurring. If so, engage an engineer to evaluate the need for repairs.

7.4 Alternatives

There are no practical alternatives to the recommendations and remedial measures discussed above.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT PATAGUANSET LAKE DAM

DATE May 20, 1981

TIME 11:00am; 3:30pm

WEATHER Fair 70°

W.S. ELEV. 63.0 U.S. 57.0 DN.S.

PARTY:

- | | |
|--------------------------------|-----------|
| 1. <u>David Sluter - NEEI</u> | 6. _____ |
| 2. <u>Stephen Fodor - NEEI</u> | 7. _____ |
| 3. <u>Steve Poulos - GEI</u> | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Geotechnical</u>	<u>S. Poulos</u>	
2. <u>Hydrology & Hydraulics</u>	<u>D. Sluter</u>	
3. <u>Civil</u>	<u>S. Fodor</u>	
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		

PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM DATE May 20, 1981
 PROJECT FEATURE Dam Embankment NAME Sluter/Fodor
 DISCIPLINE Geotechnical/Civil NAME Poulos

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	
Crest Elevation	68.0
Current Pool Elevation	63.0
Maximum Impoundment to Date	Unknown
Surface Cracks	Frost action is cracking surface concrete. No cracks observed on embankment. No pavement on embankment left of spillway.
Pavement Condition	
Movement or Settlement of Crest	None observed.
Lateral Movement	None observed.
Vertical Alignment	Satisfactory. Cracking as noted above.
Horizontal Alignment	Satisfactory.
Condition at Abutment and at Concrete Structures	Good, except for erosion as noted below.
Indications of Movement of Structural Items on Slopes	No movements observed other than as noted above.
Trespassing on Slopes	Free access. Private land on right, state land on left, referred to as Safety Zone.
Sloughing or Erosion of Slopes or Abutments	Left Abutment: Trespass erosion adjacent to concrete training wall. Crest narrowed to triangular shape at one point. Right Abutment: Embankment 2' below crest of training wall. No riprap upstream side of embankment. Trespass erosion.
Rock Slope Protection - Riprap Failures	ZP27 sheet piles on upstream side of concrete in the center portion of the dam to within 30 in. below crest
Unusual Movement or Cracking at or Near Toe	None observed.

PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM DATE May 20, 1981
 PROJECT FEATURE Dam Embankment NAME Sluter/Fodor
 DISCIPLINE Geotechnical/Civil NAME Poulos

AREA EVALUATED	CONDITION
<p><u>DAM EMBANKMENT (CON'T.)</u></p> <p>Unusual Embankment of Downstream Seepage</p> <p>Piping or Boils</p> <p>Foundation Drainage Features</p> <p>Toe Drains</p> <p>Instrumentation System</p> <p>Vegetation</p>	<p>None observed. Evidence of former erosion, on left side of spillway in vertical downstream face (eroded fines, large openings between stones)</p> <p>None observed.</p> <p>None.</p> <p>None.</p> <p>None.</p> <p>Embankment fully forested to 25" diameter. Brush beginning on concrete crest at cracks. Fully forested immediately downstream from downstream face.</p>

PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM DATE May 20, 1981
 PROJECT FEATURE _____ NAME Sluter/Fodor
 DISCIPLINE Geotechnical/Civil NAME Poulos

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT</u> Crest Elevation Current Pool Elevation Maximum Impoundment to Date Surface Cracks Pavement Condition Movement or Settlement of Crest Lateral Movement Vertical Alignment Horizontal Alignment Condition at Abutment and at Concrete Structures Indications of Movement of Structural Items on Slopes Trespassing on Slopes Sloughing or Erosion of Slopes or Abutments Rock Slope Protection - Riprap Failures Unusual Movement or Cracking at or Near Toes Unusual Embankment or Downstream Seepage Piping or Boils Foundation Drainage Features Toe Drains Instrumentation System Vegetation	No dike.

PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM DATE May 20, 1981
 PROJECT FEATURE Outlet NAME Sluter/Fodor
 DISCIPLINE Geotechnical/Civil/Hydraulic NAME Poulos

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	
a. Approach Channel	
Slope Conditions	Gentle. Brush and trees on shore of reservoir.
Bottom Conditions	Sandy.
Rock Slides or Falls	None.
Log Boom	None.
Debris	Log, minor leaves.
Condition of Concrete Lining	N/A
Drains or Weep Holes	N/A
b. Intake Structure	
Condition of Concrete	Concrete lining and sheet piles in good condition.
Stop Logs and Slots	Fair to poor condition.

PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM

DATE May 20, 1981

PROJECT FEATURE	Outlet
1. Project Name	
2. Project Description	
3. Project Objectives	
4. Project Scope	
5. Project Budget	
6. Project Timeline	
7. Project Risks	
8. Project Stakeholders	
9. Project Deliverables	
10. Project Status	

NAME Sluter/Fodor

DISCIPLINE Geotechnical/Civil/Hydraulic

NAME Poulos

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	No control tower
a. Concrete and Structural	N/A
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	N/A
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM DATE May 20, 1981
PROJECT FEATURE Outlet NAME Sluter/Fodor
DISCIPLINE Geotechnical/Civil/Hydraulic NAME Poulos

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>	None
General Condition of Concrete	N/A
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM DATE May 20, 1981
 PROJECT FEATURE Outlet NAME Sluter/Fodor
 DISCIPLINE Geotechnical/Civil/Hydraulic NAME Poulos

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u>	
General Condition of Concrete	Left training wall: very poor. Right training wall: fair.
Rust or Staining	None observed.
Spalling	Concrete of left training wall spalled and eroded to 18" deep - all the way through. Soil in back wet. No seep.
Erosion or Cavitation	12 sq ft - all reinforcing exposed
Visible Reinforcing	Soil wet at back of eroded section
Any Seepage or Efflorescence	None
Condition at Joints	None
Drain holes	None
Channel	
Loose Rock or Trees Overhanging Channel	Fully forested both sides.
Condition of Discharge Channel	Fair; minor stones and logs.

PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM DATE May 20, 1981
 PROJECT FEATURE Spillway NAME Sluter/Fodor
 DISCIPLINE Geotechnical/Civil/Hydraulic NAME Poulos

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	Natural bottom.
General Condition	Good.
Loose Rock Overhanging Channel	None.
Trees Overhanging Channel	Reservoir shore is forested.
Floor of Approach Channel	Natural silt and leaves. 3' deep below top of sheet piles at spillwa
b. Weir and Training Walls	Concrete cap over masonry
General Condition of Concrete	Fair to good. Vertical crack in left training wall over spillway 2
Rust or Staining	ft upstream from crestline. (Frost action).
Spalling	Minor
Any Visible Reinforcing	Minor erosion of grout at water lin
Any Seepage or Efflorescence	None.
Drain Holes	None.
c. Discharge Channel	None. Downstream side and right spillway weir, training walls are mortared stone with concrete walls above. Motar leaks.
General Condition	Fair.
Loose Rock Overhanging Channel	None.
Trees Overhanging Channel	Forested both sides.
Floor of Channel	Stone paving within dam and natural stonestrewn stream channel below.
Other Obstructions	A few limbs and a small walkover bridge.
Other Comments	None.

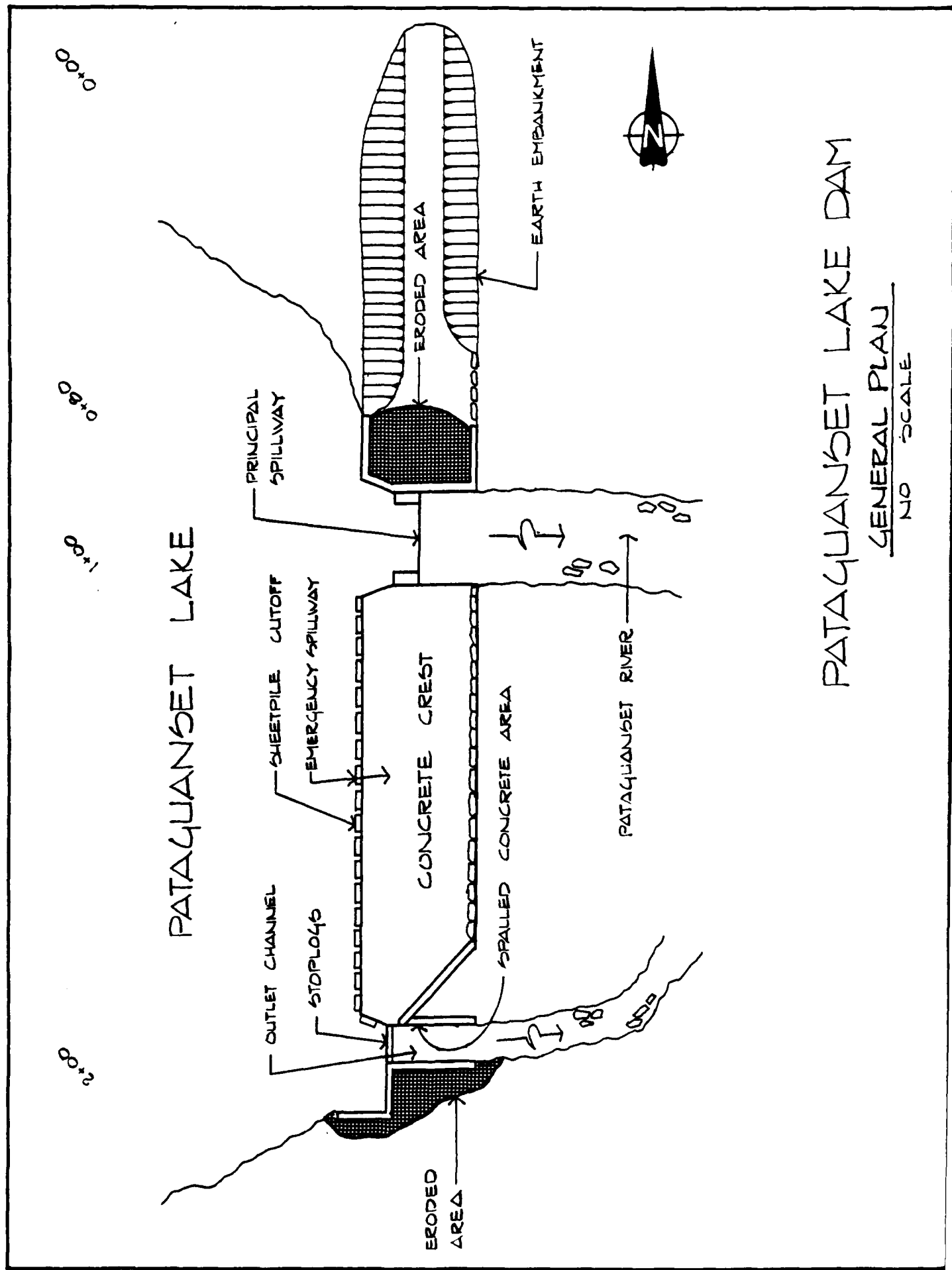
PERIODIC INSPECTION CHECKLIST

PROJECT PATAGUANSET LAKE DAM DATE May 20, 1981
 PROJECT FEATURE Bridge NAME Sluter/Fodor
 DISCIPLINE Geotechnical/Civil NAME Poulos

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u>	No service Bridge
a. Super Structure	N/A
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Underside of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	N/A
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

ENGINEERING DATA



PATAGUANGET LAKE DAM

GENERAL PLAN
NO SCALE

No. _____

WATER RESOURCES UNIT
SUPERVISION OF DAMS
INVENTORY DATA

Inventoried

By _____

Date _____

Name of Dam or Pond PATAGUANSET LAKE

Code No. _____

Nearest Street Location Pataguanset Drive

Town East Lyme

U.S.G.S. Quad. Niantic

Name of Stream Pataguanset River

Owner STATE OF CONNECTICUT - DEP

Address _____

rebuilt 1942

Pond Used For _____ Drainage Area 3.91 sq.mi.

Dimensions of Pond: Width _____ Length _____ Area 123 ac.

Total Length of Dam 180' Length of Spillway 10.5'

Location of Spillway at bed

Height of Pond Above Stream Bed 6'

Height of Embankment Above Spillway 4'

Type of Spillway Construction 2' vert. conc. masonry onto sloping conc. apron
w/ 1' drop at toe

Type of Dike Construction 25' fill/ 75' conc. slab, stone face

Downstream Conditions roads and houses

Summary of File Data March 1963 Macchi; erosion at north abutment

Remarks _____

Would Failure Cause Damage? files so indicate; not evident Class see Macchi
too low C (?)

Downstream Erosion



STATE OF CONNECTICUT

WATER RESOURCES COMMISSION

STATE OFFICE BUILDING

3

HARTFORD, CONNECTICUT 06115

June 10, 1971

STATE WATER RESOURCES
COMMISSION
RECEIVED

JUN 30 1971

Hendel Investors, Inc.
c/o Mr. Myron Hendel
35 Great Neck Road
Waterford, Connecticut

ANSWERED _____
REFERRED _____
FILED _____

Re: Pataguanset Lake Dam
East Lyme

Dear Mr. Hendel:

In your letter to us of October 21, 1967 you indicate that construction had started on the relocation of the downstream channel at this dam in accordance with our Construction Permit dated October 18, 1967.

Would you please inform us if this work has been completed.

Very truly yours,


William H. O'Brien, III
Civil Engineer

WHO:lfg

Work has been completed and plans submitted with your agency.

*Respectfully,
[Signature]*

[Signature]

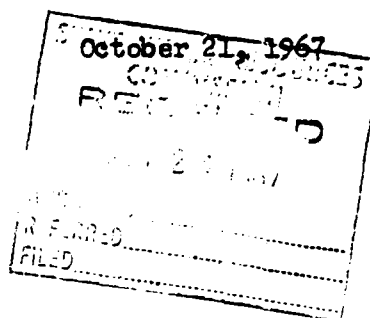


Henkel's

INCORPORATED

35 GREAT NECK ROAD - - WATERFORD, CONN.

Telephone New London 443-5337



State of Connecticut
Water Resources Commission
State Office Building
Hartford, 15, Conn.

Attention: Mr. John J. Curry, Director

Gentlemen:

This is to advise you that we have started construction on our property in the Town of East Lyme, abutting the The Pataganset Lake on the Pataganset River.

We shall notify you when the project has been completed.

Very truly yours,

HENDEL'S INVESTORS INC.

A. J. M A C C H I •

E N G I N E E R S

DR. GIULIO PIZZETTI

ASSOCIATE CONSULTANT

44 GILLET STREET
17 CORSO DUCA ABRUZZI

HARTFORD, CONN.
TORINO, ITALY

PHONE 525-8831
PHONE 519-473

N.S.P.E.

A.S.C.E.

A.C.I.

March 19, 1963

Water Resources Commission
State of Connecticut
State Office Building
165 Capitol Avenue
Hartford, Connecticut

Gentlemen:

In accordance with your verbal request of March 12, 1963, this office has inspected conditions at the following dams in the town of East Lyme, Connecticut:

Gorton's Pond
Patagansett Lake
Power's Lake

Our reports on the conditions observed are enclosed.

In general, dams constructed with vertical masonry walls on the downstream face are common in Connecticut because field stones are readily available. Properly constructed, this type of dam has proven to give many years of service. However, maintenance should not be overlooked. After many years of freeze thaw cycles the area behind the stones fills with fines which with deep freezing will progressively push the stones out of position and with nothing to push them back they will eventually reach an unstable position leading to failure. Stones placed on a slope will experience the same movement during freezing, however, the force of gravity will return them back into position during a thaw. Therefore, a dam having a stone wall with a sloping face is relatively stable.

Also, all stones do not have similar weathering characteristics. Granite, which is impervious, will resist being broken up by freeze thaw cycles, however, many field stones in Connecticut are schist or gneiss containing stratifications into which water can seep

Water Resources Commission
State of Connecticut
Hartford, Connecticut

March 19, 1963

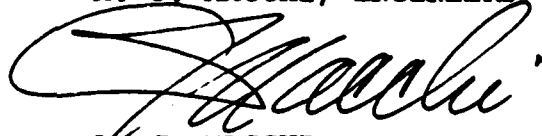
making them much more vulnerable to spalling and disintegration during freeze thaw cycles.

Walls in dams made up of these stones have a much shorter life than those constructed with granite.

Stone walls in dams that have a southern exposure will generally have more freeze thaw cycles than those with other exposures because of less thawing. This southern exposure is fairly common in Connecticut because in general, most streams flow from north to south and it is our recommendation that all stone wall dams be reviewed in consideration of these observations.

Very truly yours,

A. J. MACCHI, ENGINEERS

A handwritten signature in cursive script, appearing to read 'A. J. Macchi', written in dark ink.

A. J. MACCHI

Encl.

UKC

DAM AT PATAGANSETT LAKE, EAST LYME, CONN.

REPORT OF INSPECTION BY A. J. MACCHI, ENGINEERS

ON MARCH 15, 1963

This lake is located on the Patagansett River in the town of East Lyme, approximately one mile northwest of the intersection of Route 161 and the Connecticut Turnpike. The watershed area of this lake is approximately 2,500 acres, and there are numerous houses below the dam site.

The dam consists of a steel sheet pile bulkhead at the upstream face and reinforced concrete construction. The spillway is adequate.

The dam and spillway are generally in good condition, however, there is an area adjacent to the north abutment which has eroded and should be faced with rip rap.

STATE OF CONNECTICUT



RECEIVED

NOV 2 1955

STATE BOARD OF SUPERVISION OF DAMS

STATE WATER COMMISSION

ROOM 317, STATE OFFICE BUILDING, HARTFORD

Created by Chapter 290 of the Public Acts of 1939 to supervise dams, dikes, reservoirs and other similar structures. "All such structures, with their appurtenances, without exception and without further definition or enumeration herein, which, by breaking away or otherwise, might endanger life or property, shall be subject to the jurisdiction conferred by this act."

PLEASE REPLY TO

#114 Thayer Building
Norwich, Connecticut

October 31, 1955

Mr. Merwin E. Hupfer
Senior Engineer
State Board for the Supervision of Dams
317 State Office Building
Hartford (15) Connecticut

Dear Mr. Hupfer:-

I inspected the Dam at Pattagansett Lake near the Town of Flanders. This dam was rebuilt and strengthened I think in 1942 and the dam itself is in good condition. The water from this pond goes through a canal to the water wheels of the mill and the embankment along the canal is quite low, so that there is danger in high water of the water spilling over the canal embankment.

The only method of cutting down on the water for the canal is by means of dropping planks into a slot at the head of the canal. Unfortunately the water in swirling around the entrance of the canal has worn off some of the concrete, so that it is difficult to make the stop logs tight and consequently the water continues to go into the tailrace.

In order to correct this condition a small coffer dam only about 15 feet long will have to be built across the head of the canal at the entrance from the pond. After this is done the dam can be repaired and the water can temporarily be drawn out of the canal. Probably some new steel angles should be placed on the concrete, as they would have a tendency to stand up better than the actual concrete. There is no question about the safety of the dam but I can see where high water in the canal poses a problem for the mill owners below. I would suggest that the amount of \$2,000 be

set aside for repairs to this dam and I feel sure that the work could be within this appropriation. While the safety of the dam is not involved, it is a situation that should be corrected as soon as possible.

We are returning herewith your clippings on this dam.

Very truly yours,

BH Palmer

Member, State Board for the Supervision of D

BHP/ew
Enc.

SWCS
STATE BOARD OF SUPERVISION OF DAMS
STATE OF CONNECTICUT
MEMORANDUM

SUBJECT:

Pataganset Lake Dam, Flanders, Connecticut
(Town of East Lyme)
Needed Repairs to Dam

DATE 7/21/54

TO		FROM	
NAME		NAME	
	Mr. Wise		Mr. Snow

A letter having been received from Mr. Edward Kelly of the Pataganset Finishing Company to the effect that repairs were needed at the dam at Pataganset Lake an inspection was made in company with Mr. Joseph Waide, master mechanic at the mill.

Leaks have developed in the wall of the headrace just above the mill with the result that water seeps into the boiler room and, at times, has even flooded the boiler room. The company wishes to repair the leaks but in order to permit the work to be done the flow through the headrace must be blocked off. To do this it should only be necessary to drop stop-logs, i. e. planks, in slots in the abutments made for that purpose at the inlet end of the headrace. These abutments are actually a part of the dam.

Unfortunately, the edges of the slots have broken off, especially near the bottom, so that the planks no longer fit tightly, one on top of the other. Since the planks are not aligned vertically the water pours between them and around the ends of some of them. Because the lake and dam belong to the State Board of Fisheries and Game the Pataganset Finishing Company officials feel that that department should undertake the necessary repairs and should put the structure in good working condition in order that the flow through the headrace, or "canal" as it is sometimes called, can be controlled at all times. They would appreciate having the work done as soon as possible so that they may proceed with the project of repairing the wall mentioned above.

The same problem arose exactly three years ago (July 1951) when the Girl Scout Camp officials and others complained about a drop in the level of the lake. At that time, and even previous to that time, statements had been made that the control device at the inlet to the headrace was leaking. This matter was referred to the State Board of Fisheries and Game and it was understood that repairs had been made, but just what these repairs amounted to was never made clear. The company officials thought the Game Wardens had done some work there but they were not sure of the details.

Whatever may have been done in the past was evidently inadequate since the stop-gate now leaks worse than ever. A real repair job on the concrete abutments needs to be done.

This matter should again be referred to the State Board of Fisheries and Game. However, before anything is done which may result in a lowering of the lake level an agreement should be reached with those vitally interested in the use of the lake waters, such as the Pataganset Finishing Company, the Girl Scouts of America, etc.

It is desirable that these repairs be made in the near future since conditions are gradually growing worse and it is possible that one or more of the planks might break loose in which case a tremendous amount of water would be lost from the lake and considerable damage might be done to the mill and to other downstream property.

Prompt attention to this matter is suggested.

Willis J. Snow

P. S. This situation was described to Mr. Lyle Thorpe by telephone on July 26, 1954.

W.J.S.

P

INTERDEPARTMENT MAIL

Date July 23, 1951From Willis J. Snow, Senior Engineer Department State Water CommissionTo attention of Richard Martin, Director Department " " "

PATAGANSET LAKE DAM, FLANDERS (EAST LIME) CORN.
Leaks in Canal

I was recently called by Mr. Palmer Jerome who is on the camp committee of the Girl Scouts and whose wife is president of New London Council, Girl Scouts of America, concerning a drop in the level of Pataganset Lake. He said that the lowering of the water level was seriously affecting the operation of the camp and had made it necessary to control aquatic activities. The wading area for the small children was rendered useless and an older girl also who dove into the water struck her head on the bottom, because of the decreased depth, and was taken to the hospital for an examination.

He said that the camp officials had made measurements which indicated that the lake level had dropped two feet in the space of several days. However, when I investigated the matter I found that the measurement had been made by driving a stick into the ground at the edge of the water and then making a measurement several days later. The time interval was rather indefinite. Furthermore, such a measurement does not indicate the vertical drop in the water level, but, rather, the amount which the water line receded along the shore. Such a measurement is not very accurate or of much value since it will vary with the slope of the shore.

I also talked with Mr. John Doyle, whose home is located on the edge of Patoganset Lake. He has a dock which extends out into the lake. At the end of this dock is a rowboat with its stern tied to a stake driven into the lake bottom. Mr. Doyle said that about three weeks ago the top of this mooring stake was approximately four inches above the surface of the water. He estimates that it is now approximately ten inches out of water. This would represent a drop of about six inches.

All of this would seem to indicate that the lake has dropped somewhat but information as to the amount is rather confused.

I interviewed Mr. Bertram Booth, superintendent of Mill No. 1, Pataganset Finishing Co., and Mr. Joseph Waido, master mechanic. They had not been aware of the trouble at the Girl Scout camp, but, because of the dry weather, had recently let water down from Powers Lake.

Quite some time ago I reported a leak at the inlet end of the canal. There were apparently breaks in the concrete slots into which planks are dropped in order to control the flow out of the lake. Repairs were to be made by the State Board of Fisheries and Game since that department owns the lake. I was given the impression that this work had been completed in a satisfactory manner although I never learned exactly what had been done. At that time the company officials thought that the leak had been stopped but they did not know exactly how. They were of the opinion that the work has been done by game wardens.

Now the company officials believe that this gate is again leaking. They do not know if it is because the original project was not thoroughly completed or because there has been a new break.

INTERDEPARTMENT MAIL

Date _____

From _____ Department _____

To attention of _____ Department _____

2.

Pataganset Lake

A short distance downstream from the inlet gate there formerly existed a by-pass through which water could be diverted from the mill. A few years ago this opening was filled in with bricks, stones and dirt. On July 17, 1951, when I made my inspection I found a considerable amount of water leaking through this by-pass. The water was working its way through the filled-in area and could be heard gurgling between the bricks and stones.

The company officials volunteered the information that the gate on the canal at the mill was also leaking. They expressed a willingness to repair this gate and also the former by-pass but stated that they could not do this work unless they were able to control the flow through the canal. To do the latter it would first be necessary to repair the inlet gate. The company officials believe that this project should be carried out by the State Board of Fisheries and Game. That this amounts to I do not know as I could not see the bottom of the structure since it is under water.

The officials at the Girl Scout camp are very much worried about the situation, especially since the camp season is at its height during July and August. They would like to have the unsatisfactory condition corrected just as soon as possible.

The mill uses water for processing and the officials do not wish to lose any more water than possible.

A radical drawing down of the lake might affect fish life and could well accelerate the growth of algae.

We are now in the dry season and conservation of water is essential.

I might add that the mill is making bandages for the government and any curtailment caused by a lack of water would be to the disadvantage of the war effort.

In view of these facts I believe that officials of the State Board of Fisheries and Game and of the Pataganset Finishing Company should get together and agree upon a mutual program designed to correct this condition once and for all.

If it is necessary to draw down the lake to make any of the repairs then consideration should be given to the possibility of making temporary repairs until after the summer and dry season have passed.

This problem should be given prompt attention.

Respectfully submitted,

ARGRAVES & MORT

ENGINEERS

205 Church Street

New Haven, Connecticut

PHONE 5-2310

June 20, 1944

NEWMAN E. ARGRAVES
Reg. Prof. Eng'r.
Assoc. M. A. S. C. E.

LINWOOD G. MORT
Reg. Prof. Eng'r.

General Sanford H. Wadhams, Chairman
State Board of Supervision of Dams
Hartford, Conn.

Dear General Wadhams:

Please find enclosed Certificates
of final approval for the, Pataganset,
and Upper and Lower Bolton dams.

I visited these dams on June 11
and found them to be well constructed
and completed in accordance with
approved plans and specifications.

Will you please see that Mr. Barlow
receives his copies.

Yours very sincerely

Linwood G. Mort

6/29/44
Discussed Bolton dams with
Mr. Barlow and made him a
draft of letter reporting work
completed.

(E. G. M.)
Also told him of Mr. Jacobucci's
complaint that dams "let some
too much water."

RECEIVED
JUN 22 1944

STATE WATER COMMISSION

12/1/44 64-2-2

CHANDLER & PALMER
CIVIL ENGINEERS
Rooms 114-116 Thayer Building
Telephone 2255

Shepard B. Palmer
Benjamin H. Palmer, Jr.

Dams
Water Supplies
Sewerage
Appraisals
Reports
Surveys

Members American and Connecticut Societies
of Civil Engineers

NORWICH, CONN.

June 10, 1944

General Sanford H. Wadhams
State Board of Supervision of Dams
State Office Building
Hartford, Connecticut

Dear General Wadhams:-

I was in the State Office Building Thursday afternoon and dropped in to see you in regard to the Pataganset and Bolton Dams but learned that you and Doctor Hunter were out looking over these two dams. I am very glad to hear your comment that you were pleased with the dams. I think you will have no further trouble with them. I talked with Mr. Mort last evening on the 'phone and told him that I thought it would hardly be necessary to go with him to Pataganset as that dam in my opinion is in pretty good condition the way it was left. I told him that if he went to Pataganset first and then came to Norwich I would arrange for our Mr. Wightman who is in charge of Bolton to go up there with him and point out all the features about the dam. The upper dam, which was one of the two which was washed out had a row of steel sheet piling driven in front of the washed out section by the Jarvis Construction Co. This we have no record of but Mr. Jarvis has done work for us and we consider him very competent and honest and know that he would not attempt to deceive us in regard to this sheeting. It might have been driven a little ways back from the water and driven down so that it would not show but it would still be effective in the washed out section. The plans for these three dams are ready and my recollection is that you like to have the prints from them on cloth for permanent filing and this will be attended to.

I note your comment of Dr. Hunter in regard to one side of the Pataganset Dam but feel that we will have no difficulty in the future in this end of the dam as the concrete was carried back far enough to prevent any scouring around the end.

Very truly yours,

Shepard B. Palmer

SBP/EW

RECEIVED
JUN 12
STATE WATER

44-2-2
May 12, 1944

S. H. Wadhams, Chairman

Dr. Russell P. Hunter

State Board of Supervision of
Dams

State Board of Fisheries and
Game

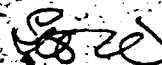
Dear Dr. Hunter:

Mr. Palmer called up this morning to say that the Patagansett and Bolton Dams were finished and asked to arrange for a final inspection. I have written Mr. Mort asking him to get in touch with Mr. Palmer and fix a date and to let me know what that date is to be. I am wondering if you would care to see the dams at the same time. If so, and you need a fellow traveler, I would try to take a look at them at the same time.

Mr. Palmer also reported that the contractor had located the key at the Bolton Dam. Will you let Mr. Palmer know what you want done with it. If you wish it sent here, he would so instruct the contractor.

Regarding protection for the draw-off valve, Mr. Palmer has talked this over with the contractor and it has been decided, if it meets with your approval, to put on a steel cover with four bolts to hold it securely in place. Possibly when you write Mr. Palmer you would tell him whether or not this is satisfactory.

Sincerely yours,



S. H. Wadhams, Chairman

SHW:VB

✓
RECEIVED

AUG 12 1943

44-2-22
STATE WATER COMMISSION

August 11, 1943

Mr. Frank L. Barlow
Asst. Deputy Comptroller
State Office Building
Hartford, Connecticut

Dear Mr. Barlow:-

Following conversation with your office this afternoon I have tied up with a representative of the Navy Department about 13 to 20 tons of sheeting for the Repairs to the Patagansett Dam. I asked for 35 pieces 36 feet long and plan to make two cuts, so that the sheeting will be driven 12 feet, which would seem to be ample to take care of the existing leak. In view of the fact that if we were going to have the sheeting, they wished it removed from the premises as soon as possible, preferably by Saturday of this week; therefore, I have talked with C. C. Lounsbury of Willimantic who makes a specialty of trucking long poles to see if he could attend to transporting the piling from Groton over to the Dam site at Patagansett. He was going to call me tomorrow forenoon and let me know if he could attend to it and also will give me a price. I will now prepare some brief specifications for the construction work and if necessary to advertise for bids, we can arrange with your office to do so. If we can find some bidders on the job, I think the price ought not to run much over \$6,000 including the sheeting. I will keep you posted in regard to the details.

It seems to me you have some regulations if a job runs over a certain figure that you must have competitive bids and advertise same and request a certified check to accompany the bid. In order that I may know if this is necessary in preparing the specifications and contract, will you kindly give me the information on the above points.

Very truly yours,

CHANDLER & PALMER

S. B. Palmer

SBP/EW

✓ Copy for General Wadhams

STATE BOARD OF FISHERIES AND GAME

COMMISSIONERS
PHILIP C. BARNEY, CHAIRMAN, FARMINGTON
JOHN E. FLAHERTY, M. D., ROCKVILLE
FRANCIS L. SHEANE, BRIDGEPORT



ADDRESS ALL MAIL TO
STATE BOARD OF
FISHERIES AND GAME
STATE OFFICE BUILDING, HARTFORD

44-2-2
STATE OF CONNECTICUT

July 23, 1943

RECEIVED
JUL 26 1943
STATE WATER COMMISSION

Mr. Roy E. Collins
Assistant Budget Director
State Capitol
Hartford, Connecticut

Dear Mr. Collins:

This department purchased the Patagansett Dam and Pond in the town of East Lyme in 1936. This dam impounds one hundred and nineteen acres of water with an average depth of twelve and a half feet. The pond was purchased primarily for the purpose of providing fishing and was acquired with the Powers Lake property which lies upstream from it in the same town.

Enclosed with this letter is a copy of the deed by which the pond was transferred to the State. As indicated in the deed, the dam is approximately 50' by 180'. It is of masonry wall with earth fill construction with a grouted spillway at the north end 10' 6" wide and at the south end a flume leading to the factory below 11' 7" wide.

I am enclosing a letter from Mr. Shepard B. Palmer of the firm of Chandler and Palmer, engineers, Norwich, Connecticut, in which he describes briefly the condition of the dam. You will note that he states that a bad leak has developed at the bottom of the spillway of the dam, has been watched for a month and found that it is increasing in volume. Mr. Palmer recommends that 103' of the dam be reinforced with sheet steel piling driven to a depth of twelve feet capped with concrete to the height of the dam.

This leak was called to our attention by the engineer of the Patagansett Mill who notified Mr. Snow, an employee of the State Water Commission. He, in turn, reported to the office of the Water Commission. Mr. Wise, engineer for the Water Commission, notified this office with the recommendation that steps be taken to correct this condition. A letter was directed by this office to the Comptroller, asking for his recommendation as to proper procedure in this matter. This letter was sent over to the Deputy Comptroller, Mr. Frank Barlow. We discussed the matter over the telephone and, since the need for repairs seemed urgent, he advised me that he would request Mr. Palmer to examine the dam and to make a report.

Mr. Roy E. Collins

July 23, 1943

No written report has yet been received from Mr. Palmer on this subject. However, I have discussed this matter with him at the dam site and at the office in Hartford, and have received from him a blueprint of the existing structure, a copy of which is enclosed, and a preliminary verbal recommendation.

In all likelihood, the cost of the contract job which can be let out to bid on receipt of Mr. Palmer's specifications will be in the neighborhood of \$5000. An estimate on the cost of the steel required is \$720, engineering costs may be in the neighborhood of \$500.

Inasmuch as this project was not anticipated at the time that our budget was drawn and was under consideration by the Appropriations Committee and the General Assembly, it appears advisable to request that funds for this emergency repair be made available from the Governor's contingent fund. The purpose of this letter is to apprise you of this situation in order that it may be called to the Governor's attention and that proper steps be taken to provide for the funds necessary for the completion of the specifications, advertising the bids, etc.

The claim of the Patagansett Mill for a continuous water supply as provided in the deed should also be considered. As Mr. Palmer points out in his letter, the Patagansett Company are engaged solely in the manufacture of surgical dressings for the United States Government and an uninterrupted supply of satisfactory wash water is essential for their continued operation. The safety of property and life on the stream below the dam should also be given full consideration in the event of a complete failure of the dam.

Very truly yours,

R. P. HUNTER
Superintendent

RPH/PC

C O P Y

July 21, 1943

RECEIVED

JUL 26 1943

STATE WATER COMMISSION

44-2-2
Mr. Newton Drew
Project Manager
Ford, Bacon & Davis
Groton, Connecticut

Dear Sir:-

The State of Connecticut owns a Dam and large pond about six miles South of New London on the Boston-Post Road. The water from this pond furnishes process water used by the Patagansett Co. in its mill located a few hundred feet below the dam. The Patagansett Co. are engaged solely in the manufacture of surgical dressings for the U. S. Government and it is very vital that a regular supply of process water for this plant be continued.

A bad leak has developed at the bottom of the spillway of this dam and has been watched for a month and found that it is increasing in volume. Our firm has been retained to correct this situation and put the dam in a safe condition. As you know, it is hopeless to try to obtain new sheeting at present. We are recommending to the State that they drive a row of steel sheet piling just above the dam and cap this over with concrete up to the height of the dam. I was in Groton this morning and got in touch with Benjamin Palmer who formerly was connected with this office, and he showed me quite a large pile of steel sheeting alongside of one of your railroad tracks and suggested, while he understood that the piling belonged to the Navy, we take the matter up with you and see if you could release from 18 to 20 tons of this sheeting. The sheets which I saw seemed to be made up of sheets about 36 feet long and this would be just about what we would require at this dam by making two cuts. I noticed in your yard you had several cranes operating on the railroad tracks. Could you arrange to save for the State this amount of sheeting and quote me a price loaded on trucks by your cranes. We would send the trucks to the year for the same. I notice some of the sheets were bruised somewhat on the ends but would be all right for us to use after they were cut for the purpose mentioned above. I know the State and Patagansett Co. would greatly appreciate your cooperation in this matter in order to keep this vital industry in operation. Sheets about 12 feet long are what we would like to use but we can arrange to have the full lengths and make the cuts on the job.

Very truly yours,

(signed) Shepard B. Palmer
Chandler & Palmer

Copied by FC
7-23-43

44-2-2

July 13, 1943
William S. Wise

Memorandum to General Wadhams

Pataganset Dam
Flanders, Conn.

Mr. Snow telephoned from the Pataganset Finishing Co. this morning to say that the officials had called him this morning to say that the leaks through the dam have apparently increased and that they are concerned about the situation. The water in the pond has dropped, some of which probably is due to the dry weather.

Mr. Snow also feels that the leaks have increased and has found another leak which he had not observed before. There are about a half dozen leaks of various sizes. The Pataganset people are going to try to plug some of these openings with burlap.

I called Dr. Hunter and reported the matter to him. Dr. Hunter is going to call Mr. Barlow re the status of the employment of Mr. Palmer to make a study and recommendations and also suggest calling Mr. Palmer regarding the urgency of the problem.

Respectfully submitted,

William S. Wise

William S. Wise

Later in day

7/13/43

C

Dr. Hunter telephoned to say that Mr. Barlow's secretary had given him the following information: On July 1, General Wadhams and Mr. Palmer discussed this problem with Mr. Barlow and arrived at some agreement for Mr. Palmer to proceed with the work. Mr. Palmer later notified Mr. Barlow that he thought he could secure some steel sheet piling in Norwich for the repairs. In as much as the work would probably cost more than \$1,000 it was necessary to prepare plans and specifications for bids, which Mr. Palmer is apparently now doing.

Dr. Hunter is going to call Mr. Palmer re the status of this matter

and suggests that a letter be written from this office to Mr. Barlow in reference to Mr. Snow's report by telephone this morning.

MSW.

7/1/43

44-2-2

RECEIVED
JUL 5 1943
STATE WATER CONTROL

July 1, 1943

Mr. Frank L. Barlow
Asst. Comptroller
Office of the Comptroller
State Capitol
Hartford, Connecticut

Dear Mr. Barlow:-

Thanks for the cordial reception given to General Wadhams and me yesterday afternoon.

In regard to the Patagasset Dam if it meets with your approval, I will have some measures made there, some levels taken and make a simple plan showing our recommendation for correcting the weakness after talking with the Manager of the Mill located just below the dam to see if I can learn from him whether he considers the leak to be gradually increasing.

I know where there is some steel sheeting at Groton which was used in connection with the Electric Boat Co. work and which is owned by the Navy. With your assistance I think enough of this could be obtained from the Navy Department to assist in making the necessary repairs to the dam.

The labor and material on this will come to over \$1,000 so we would have to advertise for bids according to your custom.

Unless I hear from you to the contrary, I plan to proceed as above.

Very truly yours,

SHEPARD L. PALMER

SEP '43

44-2-2
June 18, 1943

S. H. Wadhams, Chairman

Board of Supervision of Dams

Dr. Russell P. Hunter
Superintendent

Board of Fisheries & Game

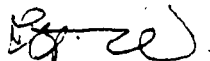
Dear Dr. Hunter:

Last fall we discussed your dam at Lake Pataganset in Flanders. You will recall that at that time it had quite a leak. We decided we could probably safely let it go over the winter without repairs.

Mr. Snow was there a few days ago and he reports that the leak has increased considerably. The giving way of the dam would probably not do much damage except to the Pataganset Finishing Company which would be directly in the path of the water. This plant is working night and day on surgical supplies for the Army.

The water is high in the pond, and it probably would be difficult to make any repairs at the present time. However, if you have it in mind to fix the dam up, I would suggest that you might have the plans prepared now so that you would be ready if and when we have dry weather with lower stream flows.

Very sincerely yours,



S. H. Wadhams, Chairman

SEN L

6/21/43

Note: Dr. Hunter called up on Sat., June 19, with reference to procedure he might follow regarding the above. In your absence I suggested that he might bring the matter of repairing the dam - an asset of the State - to the Comptroller's attention. Dr. Hunter said he would write the Comptroller a letter. IMC

Copy to Dr. Hunter 12/2/42

STATE OF CONNECTICUT

SANFORD H. WADHAMS, CHAIRMAN

HARTFORD

SHEPARD B. PALMER, SECRETARY

Hartford



RECEIVED

44-2-2

1942

CLARENCE M. BLAIR, NEW HAVEN

WILLIAM H. GAGWELL, NEW BRITAIN

JOSEPH W. CONE, GREENWICH

WILLIAM A. MACKENZIE, WALLINGFORD

V. B. Clarke, Ansonia

E. B. Fort, Guilford

STATE BOARD OF SUPERVISION OF DAMS

ROOM 317, STATE OFFICE BUILDING, HARTFORD

Created by Chapter 290 of the Public Acts of 1939 to supervise dams, dikes, reservoirs and other similar structures. "All such structures, with their appurtenances, without exception and without further definition or enumeration herein, which, by breaking away or otherwise, might endanger life or property, shall be subject to the jurisdiction conferred by this act."

November 30, 1942

PLEASE REPLY TO V. B. Clarke
Ansonia, Conn.

General Sanford H. Wadhams, Chairman
State Board of Supervision of Dams
317 State Office Bldg., Hartford.

Dear General Wadhams:

I received your letter of the 27th., regarding the dam on Pataganset Lake last Saturday and thought with the uncertainty of the weather it might be advisable to go immediately. I therefore inspected this dam yesterday.

I found there was quite a leak which showed just below the spillway, I should say about the capacity of a 4 inch pipe. Can you find out from Dr. Hunter, or obtain the information, as to whether this is an old leak or a new one? I am inclined to think that it has leaked for some time. However it may have gotten worse. It also does not appear to me that the safety of the dam might be involved although the leak might open up larger and empty out a portion of the Lake.

The whole dam is a poor structure and it is hard to tell just what the construction is. There are dry rubble walls on both the up-stream and down-stream sides of the dam and I assume it is earth fill in between. The spillway has a section of concrete about $4\frac{1}{2}$ feet wide and just how far down it extends I do not know. Apparently there is rubble masonry underneath. It was also difficult to determine where the leak comes from

It might come from along the spillway section, on the other hand I noticed a depression in the earth about 20 feet Westerly of the westerly side of the spillway and near the up-stream side of the dam. It is a depression of about 2 feet one way by 3 feet the other way and apparently settled 6 or 8 inches.

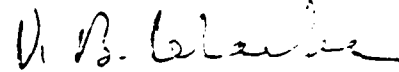
I really believe a new dam should be built in this location. The present one is quite an old affair and one does not know just what the construction is. Plans can be made to repair the leak, which might be advisable depending upon what information is gotten regarding the old leak. If repairs were to be made to try to remedy the present leak I would suggest the following method: Draw down the Lake through the power intake; excavate in front of the spillway section, which is about 15 feet in width and a little each side making 20 feet in all; carry down the excavation to what appears to be a good stratum, which might be 6 or 8 feet below the spillway level. Then construct a concrete cut-off 1 foot wide on top and 2 feet on bottom. This concrete should be a rich mixture, say $1:2\frac{1}{2}:3\frac{1}{2}$. In back-filling the space beyond the concrete that would be excavated I would suggest using clay. A compressor would be needed on the job with a tamper in order to compact the clay thoroughly. Of course there would also have to be some pumping done while the work was going on.

(I can go into more detail and give you sketches of a repair job if you wish, and would estimate that it should be done inside of \$1000.00.

Whatever you wish in regard to this matter I will be glad to help in any way that I can.

Awaiting to hear from you, I remain,

Very cordially yours,

A handwritten signature in cursive script, appearing to read "V. B. Glavin".

Member, State Board of
Supervision of Dams

VBC:M

COPY

FISH & GAME DEPT.
MEMORANDUM
THA

44-2-2

Date *SEP 14*, 1942
RECEIVED
OCT 24 1942
STATE WATER COMMISSION

To: Supt. Hunter.....
From: Capt. Banning.....
Subject:

In reference to the report of Mr. Snow of the State Water Commission concerning leak in the concrete spillway at Pataganset Dam, I inspected this dam on September 19. At that time there was a small leak at the bottom of the spillway. This leak at present is not serious and has been the same quantity ever since the dam was taken over by the Department. We at various times have tried to stop same without results. It is my impression that it would be necessary to do a major job there in the future when conditions are better. The Pataganset Finishing Company at present use practically all the water flowing into this pond, and to do a thorough job we would have to draw this pond below the raceway supplying the Finishing Company.

FNB:RM:RS

44-2-1

✓

W. J. Snow
September 11, 1942

Memorandum to General Wadhams:

Subject: Pataganset Finishing Company Inc. (Mill #1)
Flanders
Leak in dam

While making an inspection of Pataganset Finishing Company at Flanders on September 11, I was informed by Mr. Kelly, plant manager, that one of his men had reported a leak in the dam at the outlet end of Pataganset Lake. The workman had stated that a considerable amount of water was being lost and that he had endeavored to temporarily reduce the amount of water which was being lost in this manner.

We made an inspection of the dam and found that the trouble was at the stone and concrete spillway. It was very similar to the leak which occurred some time ago and about which I made a report at the time. Since the lake and dam are both owned by the State Board of Fisheries and Game, that department had the repairs made. At the present time, water is trickling through the spillway at a considerable rate and it is quite likely that the flow will increase rather than decrease. Rags have been stuffed into some of the openings on the up stream side of the spillway in an effort to reduce the amount of leakage. The spillway is so thick and low that there is little likelihood that it will be washed out very soon. However, the leak will cause the water in the pond to be drawn down and will, therefore, handicap the textile mill at a time when all facilities are being pushed to the utmost because of emergent war contracts. Furthermore, I would expect that the drawing down of the pond to any considerable extent might be somewhat detrimental to the fish life which it contains. It would seem, therefore, that it would be well to repair the spillway as soon as possible. It would be well to do this now since the pond could be drawn down to permit the work to be done on the spillway and there would still be time for the lake to fill up again before winter weather sets in.

I would recommend that the work be undertaken while the weather is still good and before the start of the fall rains.

I suggest that this matter be referred to the State Board of Fisheries & Game for its consideration.

Respectfully submitted,

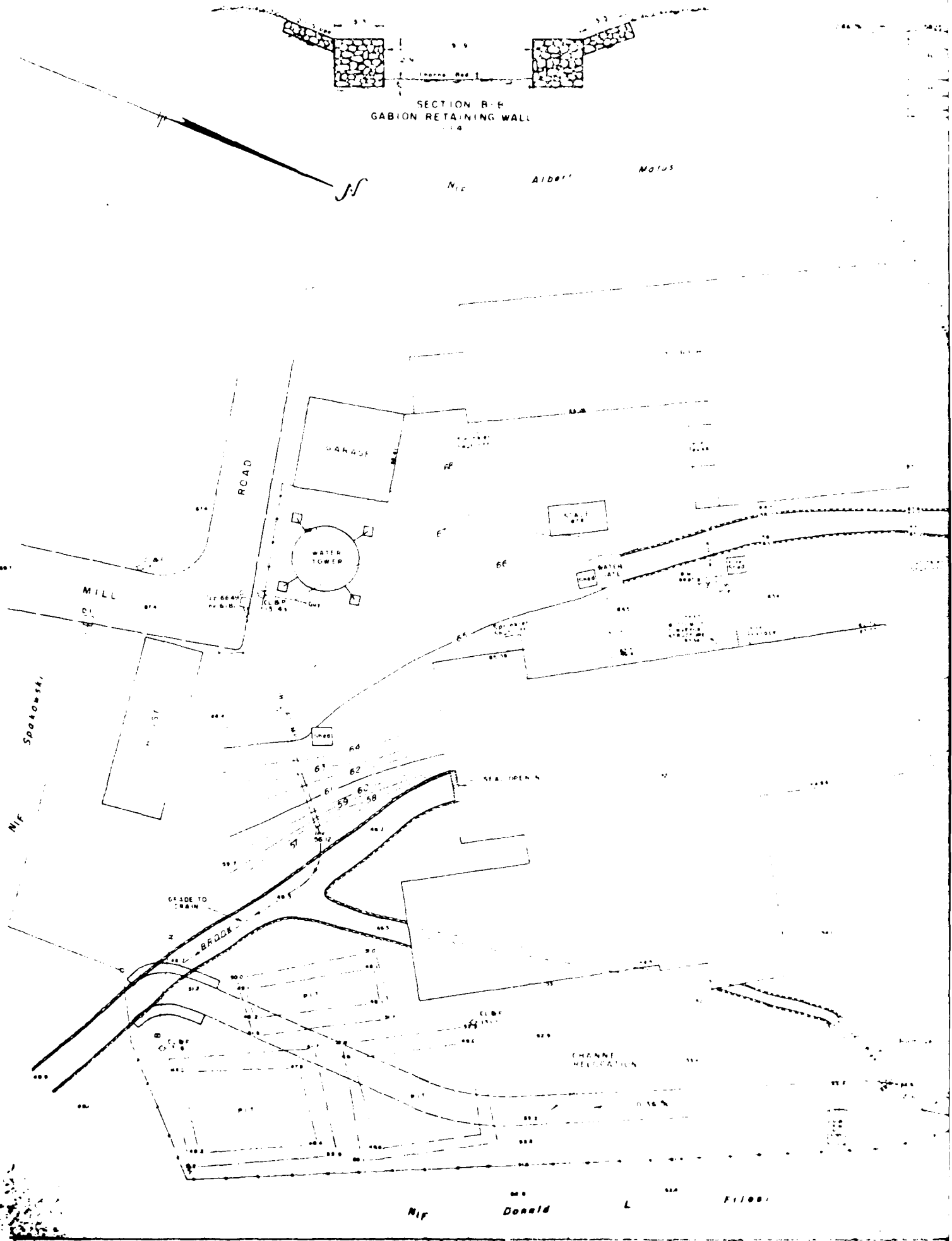
Willis J. Snow

Willis J. Snow, Sanitary Engineer

s/ K

copy sent to Dr. Hunter, D.S. 9/14/42

SECTION B-B
GABION RETAINING WALL



Retaining Wall
(See Section B-B)

NOTE: Letters shown on Gabions refer to Macgregor River Type Gabion price list and indicate size of Gabion

PATTAGANSETT

SECTION A-A
GABION WEIR
(1:4)

DeGoriano
Beverly A
NIF

Barbara Benlies

George F

NIF

CANAL

Excavate to handle
intermittent stream

CHANNEL
RELOCATION

4' x 6' Gabions
Gabion Slope protection

Elizabeth

NIF

NOT TO SCALE

FREDERICK A. RADCLIFFE
CONSULTING CIVIL ENGINEER
CHIEF INDUSTRIAL ENGINEER
CENTENNIAL CORP.

TITLE: PROPOSED CHANNEL RELOCATION
ON LAND OF
HENDL INVESTORS, INC.
EAST LYME, CONN.

DATE: 1-20-57
BY: 8/12/57
OF: 1 OF 1

APPENDIX C

PHOTOGRAPHS

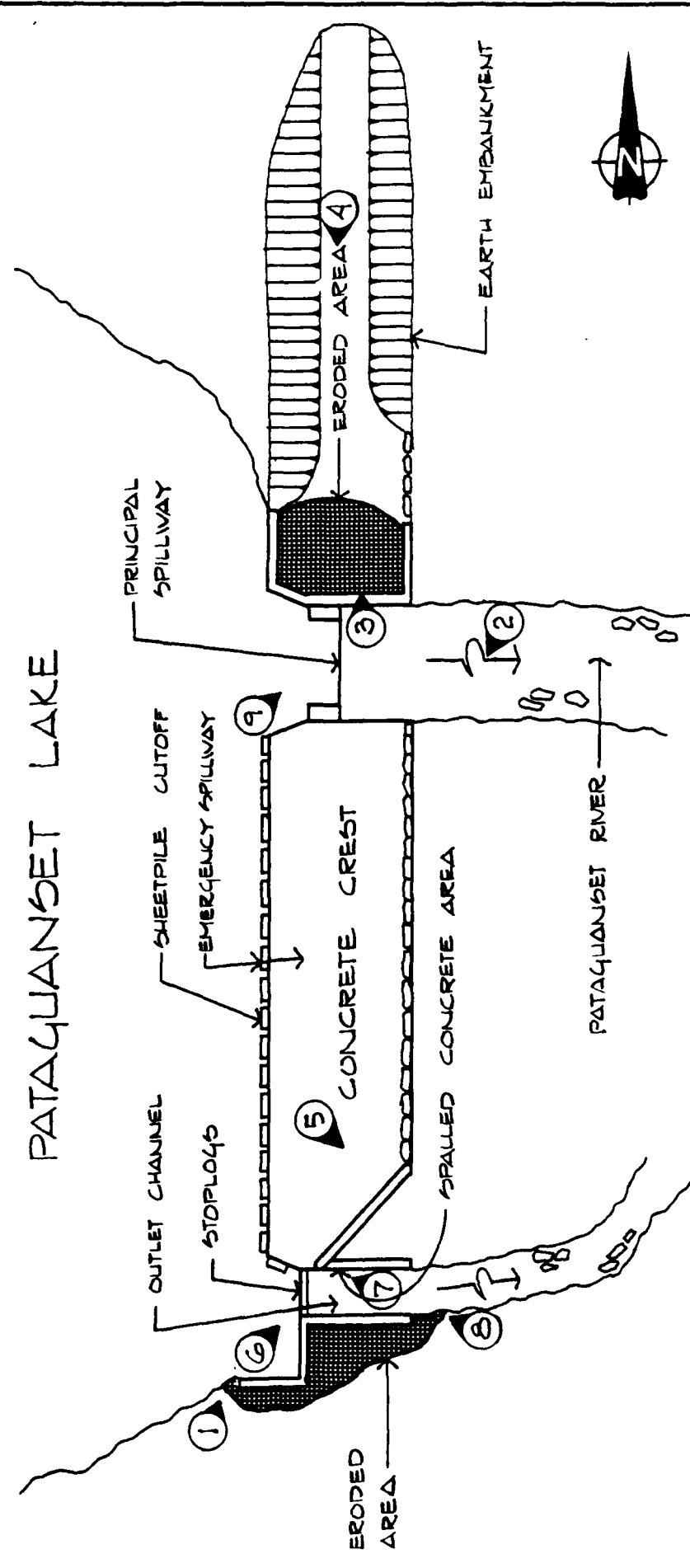
00+0

OVERVIEW

00+0

8

00+2



PATAQUANGET LAKE

PATAQUANGET RIVER

PATAQUANGET LAKE DAM

PHOTO INDEX
NO SCALE

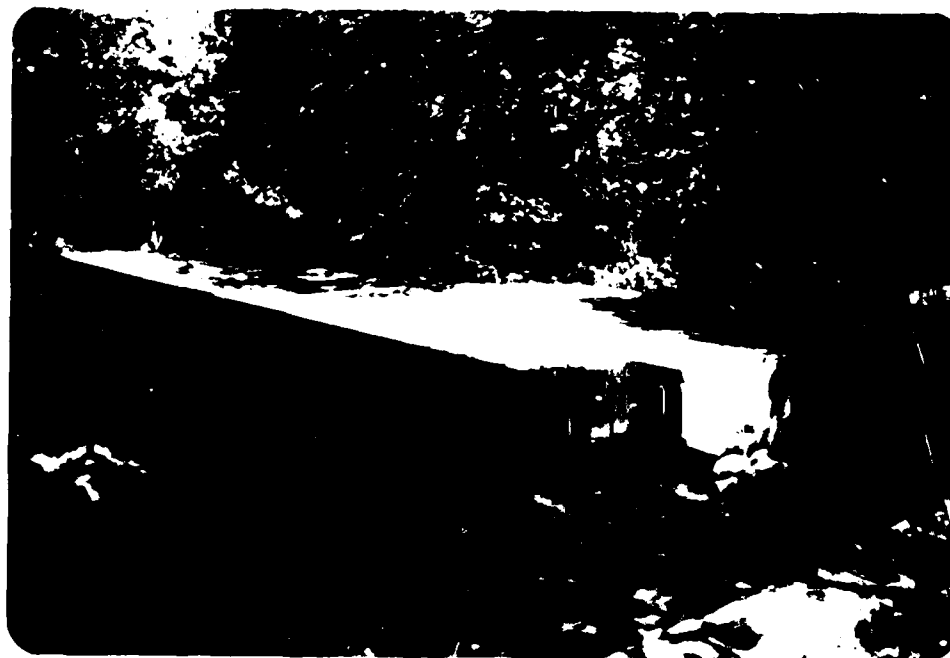


PHOTO C-1. Upstream face and crest of center dam section.



PHOTO C-2. Downstream face of the dam.



PHOTO C-3. Earth embankment at left end of the dam.



PHOTO C-4. Looking along crest of dam from the left.

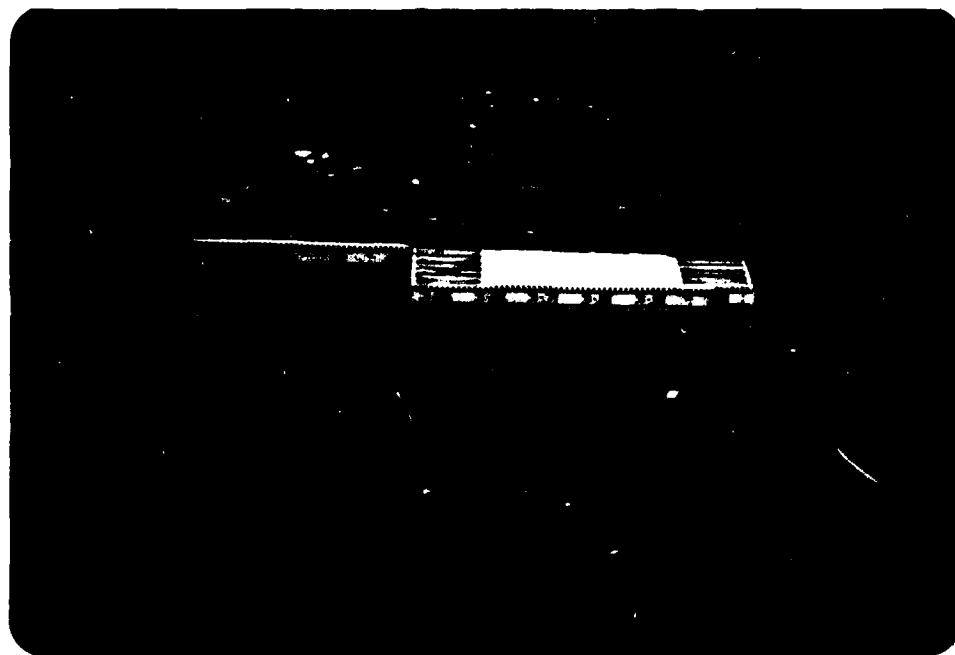


PHOTO C-5. Crack in concrete paving on center section of dam.



PHOTO C-6. Outlet channel from upstream showing stop logs and slots.



PHOTO C-7. Closeup of eroded outlet channel training wall.



PHOTO C-8. Outlet channel from downstream.



PHOTO C-9. Spillway from upstream.

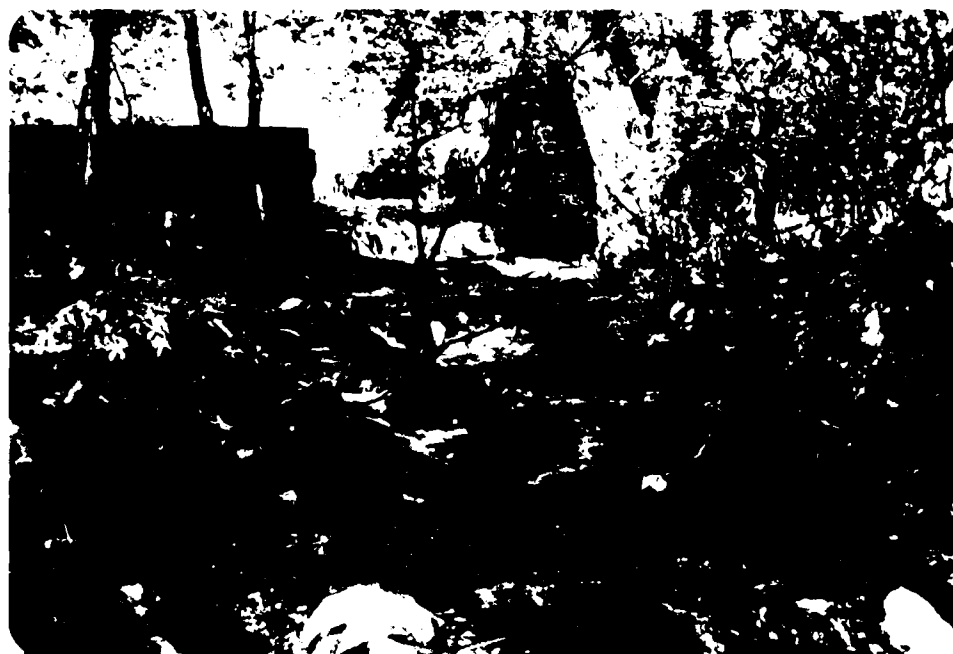


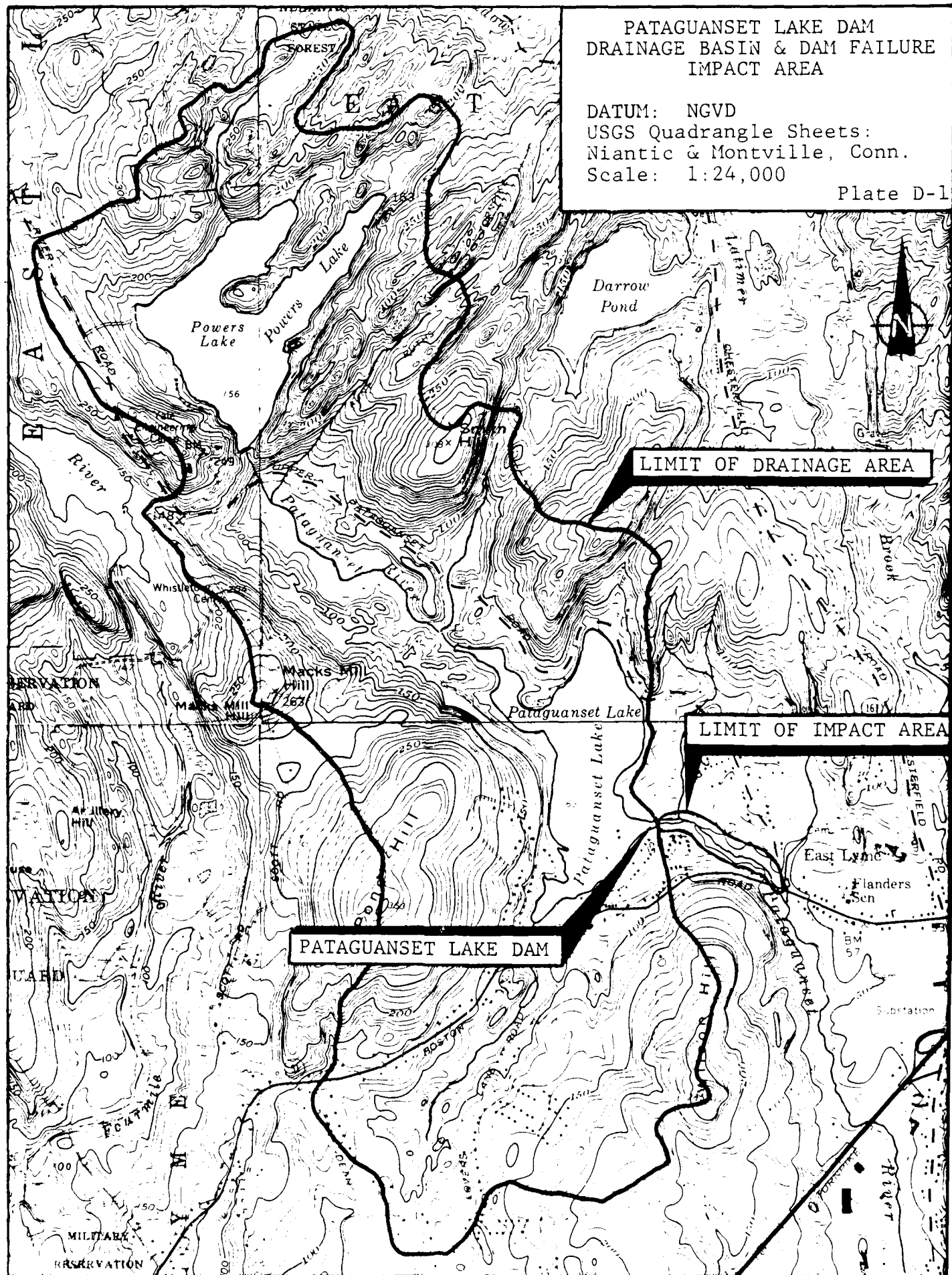
PHOTO C-10. Spillway and discharge channel from downstream.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

DATUM: NGVD
USGS Quadrangle Sheets:
Niantic & Montville, Conn.
Scale: 1:24,000

Plate D-1



Job No. 81061 Sheet 1 of 11
Project PATAGUANSET LAKE DAM Date 6/1/81
Subject HYDRAULIC/HYDROLOGIC CALCULATIONS By SMF Ch'k. by

PATAGUANSET LAKE DAMBASIC DATA

DRAINAGE AREA = 3.6 SQ MI
NORMAL POOL ELEV = 62.7 FT
MAX. POOL ELEV = 68.0 FT

RESERVOIR

@ NORMAL POOL AREA = 120 AC STOR = 310 AC-FT
@ MAX POOL AREA = 120 AC STOR = 950 AC-FT
@ TEST FLOOD POOL AREA = 120 AC STOR = 990 AC-FT

DAM

EARTH EMBANKMENT - DOWNSTREAM FACE
IS VERTICAL STONE MASONRY, UPSTREAM
IS STEEL SHEET PILING
LENGTH = 210 FT
MAX. HEIGHT = 11.6 FT

SPILLWAY

STONE MASONRY W/ A CONCRETE CAP
ROAD CREST WIER - FREE OVERFLOW
LENGTH 13' TO A HEIGHT OF 1' THEN
THE LENGTH INCREASES TO 15'

OUTLET

CONCRETE CHANNEL W/ STOPLOG CONTROL
AT THE UPSTREAM END
WIDTH = 6'
BOTTOM ELEV = 60.4 FT @
2.5' BELOW POOL FILL

Job No. B1061

Project PATAGUANSET LAKE DAM

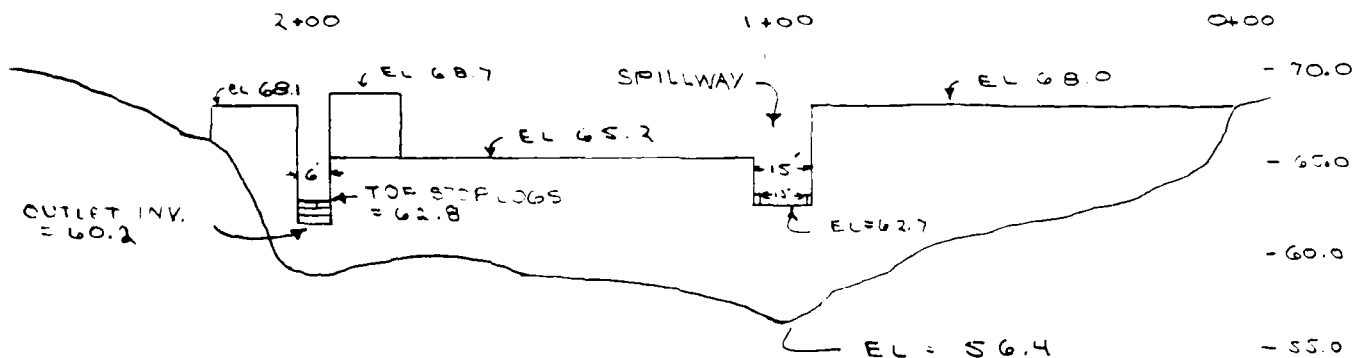
Subject HYDRAULIC/HYDROLOGIC CALCULATIONS

Sheet 2 of 11

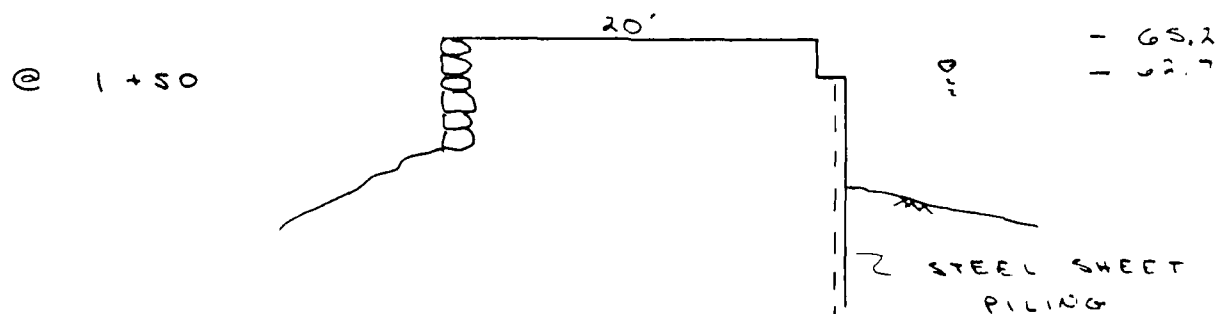
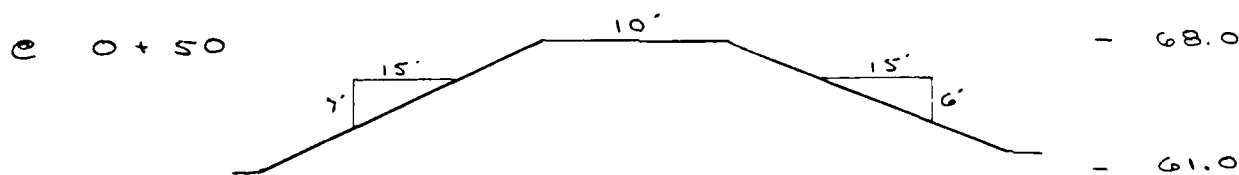
Date 6/2/81

By SMA Ch'k. by

SECTION ALONG DAM LOOKING UPSTREAM



SECTIONS THRU DAM



Job No. 81061Project PATAGUANSET LAKE DAM

Subject _____

Sheet 3 of 11Date 6/2/81By SMF Ch'k. by _____CALCULATE TEST FLOOD

CLASSIFICATION

SIZE : SMALL

HAZARD: SIGNIFICANT

USE 1/2 PMF AS MODIFIED FOR TEST FLOOD

BASIN SLOPE = 0.04 TO 0.1 - ROLLING

FROM COE PMF CURVES WITH

A 3.6 SQ MI DRAINAGE AREA

PMF = 1950 CSM

1/2 PMF = 975 CSM

REDUCE TEST FLOOD 15% FOR UPPER

BASIN STORAGE AT POWELL LAKE

 $.85 \times 975 = 830 \text{ CSM}$ TEST FLOOD = $3.62 \text{ SQ. MI} \times 830$ $= 3000 \text{ CFS}$ CALCULATE DAM RATING CURVE

$$Q = CLH^{3/2}$$

RIGHT L = 6' C = 3.0

LEFT L = 13' TO 1' HD THEN 15' C = 3.0

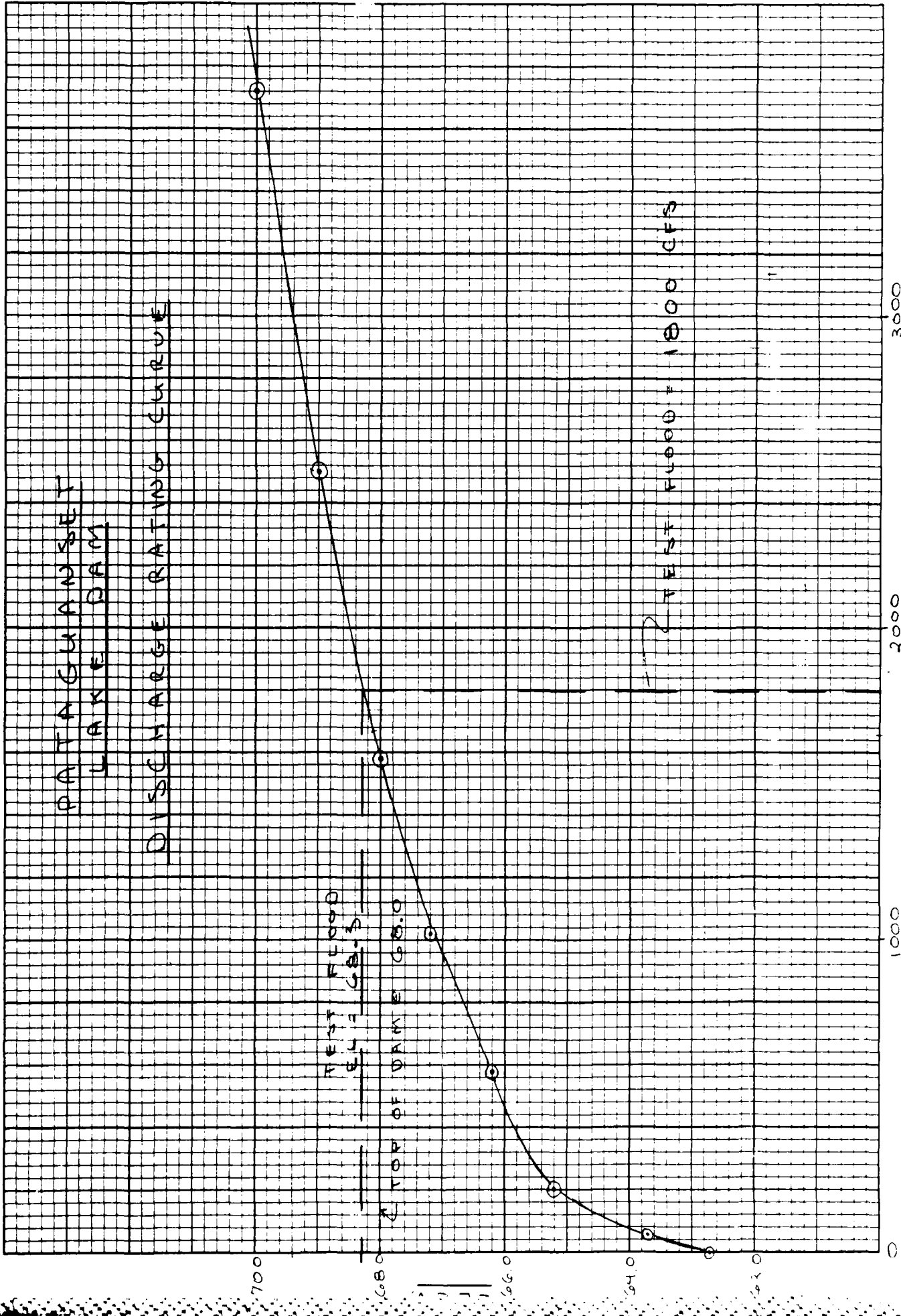
CENTER L = 70 FT C = 2.5

TOP OF DAM L = 100' C = 2.2

ELEV	LEFT SHILL		RIGHT OUTLET		CENTER		TOP DAM		TOTAL Q
	H	Q	H	Q	H	Q	H	Q	
62.7	-	-	-	-	-	-	-	-	-
63.7	1.0	39	0.8	12	-	-	-	-	52
65.2	2.5	130	2.2	20	-	-	-	-	200
66.4	3.5	200	3.2	110	1.0	175	-	-	585
67.2	4.5	270	4.3	160	2.0	500	-	-	1030
68.0	5.2	550	5.1	210	2.8	820	-	-	1580
69.0	6.2	710	6.1	270	3.8	1200	1.0	230	2010
70.0	7.2	870	7.1	340	4.8	1840	2.0	600	2720

PATAGUANSET
LAKE DAM

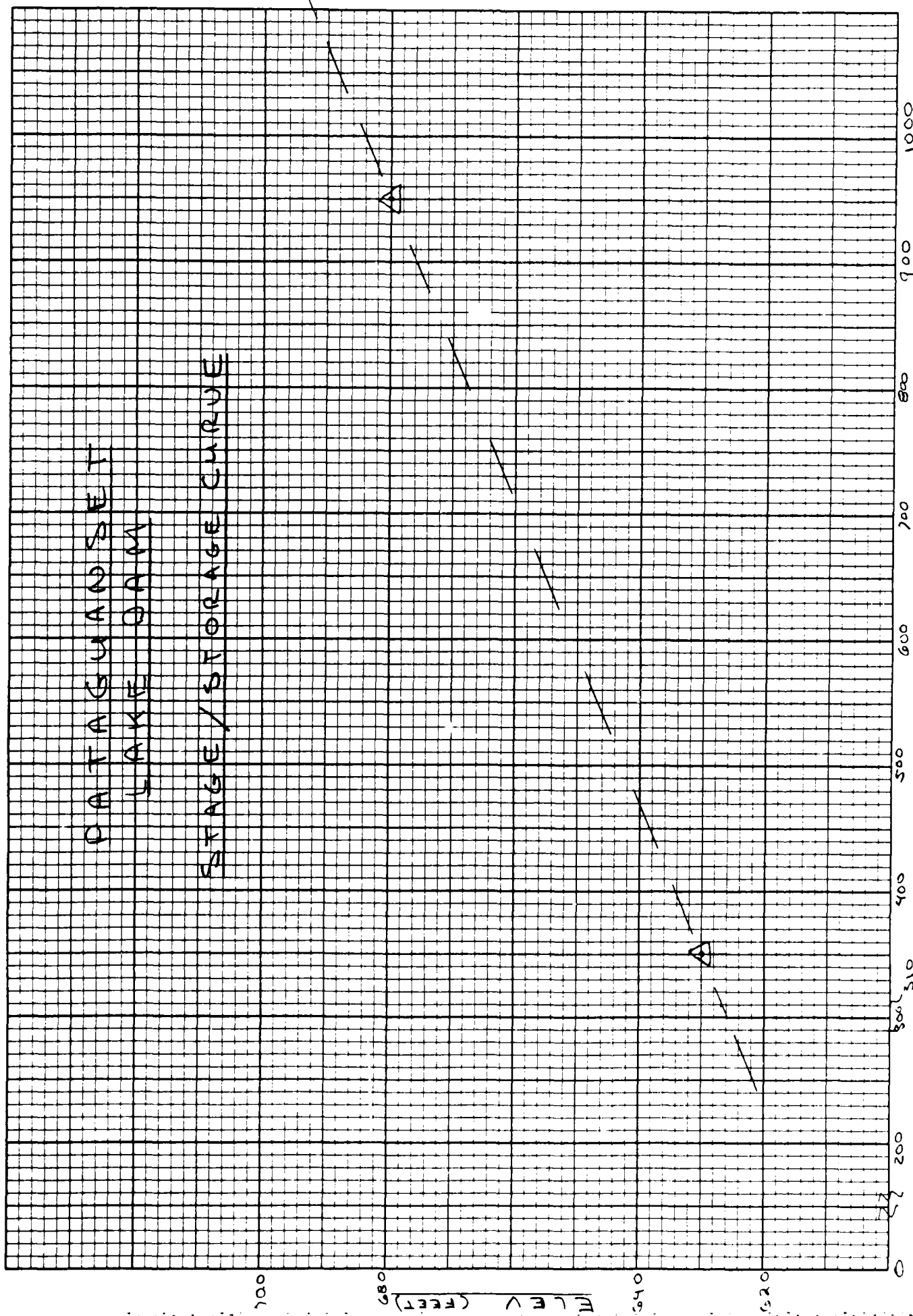
DISCHARGE RATING CURVE



DISCHARGE (CFS)

PATAGUAYAN SET
LAKE DAM

STAGE / STORAGE CURVE



STORAGE (AC-FT)

Job No. 81061Project PATAGUANSET

Subject _____

Sheet 6 of 11Date 6/2/81By S.F. Ch'k. by _____CALCULATE EFFECT OF SURCHARGE STORAGE

PEAK INFLOW = 3000 CFS. SURCHARGE = 6.7'

SURCHARGE VOLUME = 1110 - 310 = 800 AC-FT

$$STOR_1 = \frac{800 \text{ AC-FT} \times 12 \text{ IN/FT}}{3.6 \text{ SQ MI} \times 640 \text{ AC/SQ MI}} = 4.2 \text{ IN}$$

$$QP_2 = 3000 \left(1 - \frac{4.2}{9.5} \right) = 1670 \text{ CFS.}$$

SURCHARGE @ 1670 CFS = 5.4' VOL = 650 AC-FT

$$STOR_2 = \frac{650 \text{ AC-FT} \times 12 \text{ IN/FT}}{3.6 \text{ SQ MI} \times 640} = 3.4 \text{ IN}$$

$$STOR_{AVG} = \frac{4.2 + 3.4}{2} = 3.8 \text{ IN}$$

$$QP_3 = 3000 \left(1 - \frac{3.8}{9.5} \right) \\ = 1800 \text{ CFS}$$

- 1) STORAGE WILL REDUCE THE TEST FLOOD BY 1200 CFS OR 40%
- 2) THE SPILLWAYS + CENTRAL PORTION OF THE DAM WILL PASS 1580 CFS OR 88% OF THE TEST FLOOD.
- 3) AT THE TEST FLOOD DISCHARGE 1800 CFS THE DAM WILL BE OVERTOPPED BY 0.3 FT.

Job No. 81061Project PATAGUANSET

Subject _____

Sheet 7 of 11Date 6/2/81By SME Ch'k. by _____DAM FAILURE ANALYSIS

DAM FAILURE DISCHARGE CALCULATED
ACCORDING TO C.O.E. GUIDELINES

$$Q_{\text{FAIL}} = 8/27 W_b \sqrt{g} Y_0^{3/2}$$

W_b = BREACH WIDTH = 35 FT (ASSUMED)

Y_0 = USE Y_0 = 10 FT. (HEIGHT @ E DAM)

$$\begin{aligned} Q_{\text{FAIL}} &= 8/27 (35) \sqrt{32.2} (10^{3/2}) \\ &= 1860 \text{ CFS.} \end{aligned}$$

ASSUME SPILLWAY FLOW IS REDUCED BY
60% - DAM OVERFLOW IN CENTER + OUTLET
FLOW CONTINUE TO CONTRIBUTE

$$(.4 \times 550) + 210 + 820 = 1250 \text{ CFS}$$

$$\begin{aligned} \text{TOTAL FAILURE FLOW} \\ &= 1860 + 1250 \\ &= 3100 \text{ CFS} \end{aligned}$$

DOWN STREAM IMPACT

$$\begin{aligned} \text{MAX FLOW DEPTH INITIALLY} &= 4/9 Y_0 \\ &= 4.5 \text{ FT} \end{aligned}$$

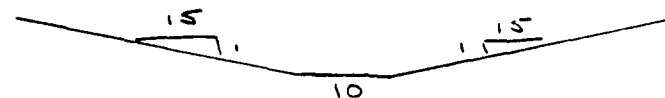
RIVER FLOWING 2500' DOWNSTREAM
TO A BOX CULVERT UNDER THE
BOSTON POST ROAD

Job No. 81061Project PATAGUANSET

Subject _____

Sheet 8 of 11Date 6/4/81By SMF Ch'k. by _____

REACH 1

X-SECTION FROM OBSERVATION
AND U.S.G.S. TOPOREACH LENGTH
= 2500'

SLOPE = .003

 $n_f = 0.05$

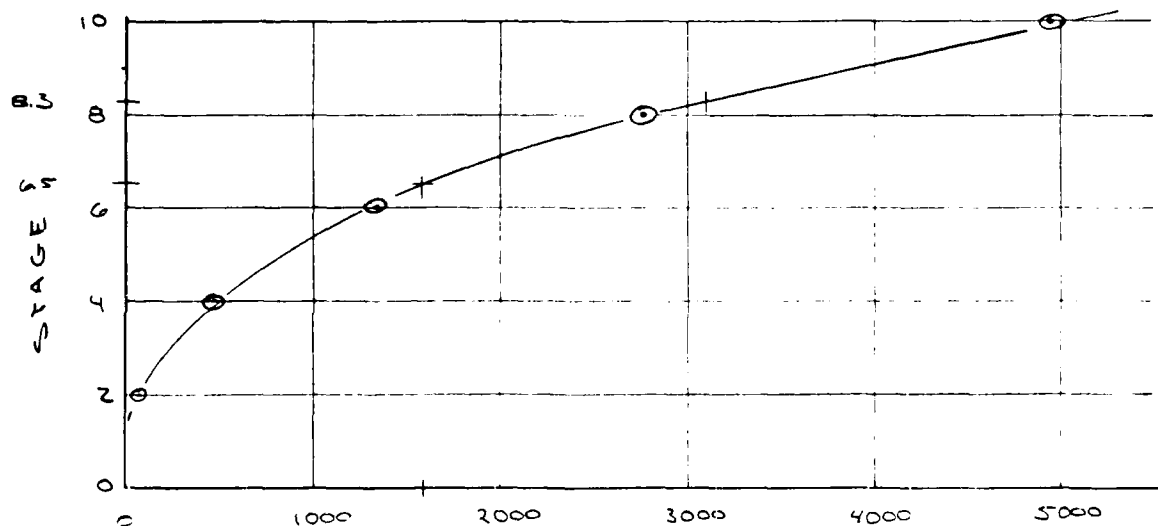
REACH RATING CURVE

 $S_f^{1/2} = 0.055$

$$Q = \frac{1.49}{n} A R^{2/3} S_f^{1/2}$$

$$\frac{1.49}{0.055}(0.055) = 1.64$$

STAGE	A	WP	R	$R^{2/3}$	Q
2	80	140	.57	.69	90 CFS
4	280	260	1.08	1.05	480 CFS
6	600	380	1.58	1.36	1340 CFS
8	1040	500	2.08	1.63	2780 CFS
10	1600	620	2.58	1.89	4960 CFS



DAM FAILURE FLOW OF 3100 CFS
WILL RAISE FLOOD LEVELS 1.8 FEET
OVER PRE FAILURE LEVELS

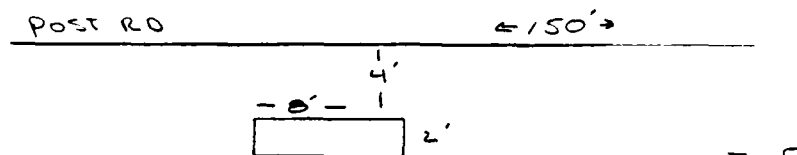
Job No. 81061Project PATAGUANSET

Subject _____

Sheet 9 of 11Date 6/4/81By SME Ch'k. by _____

CHECK FLOOD FLOW @ CULVERT @ THE
BOSTON POST ROAD - US RT 1 - 2500'
DOWNSTREAM FROM DAM

SECTION

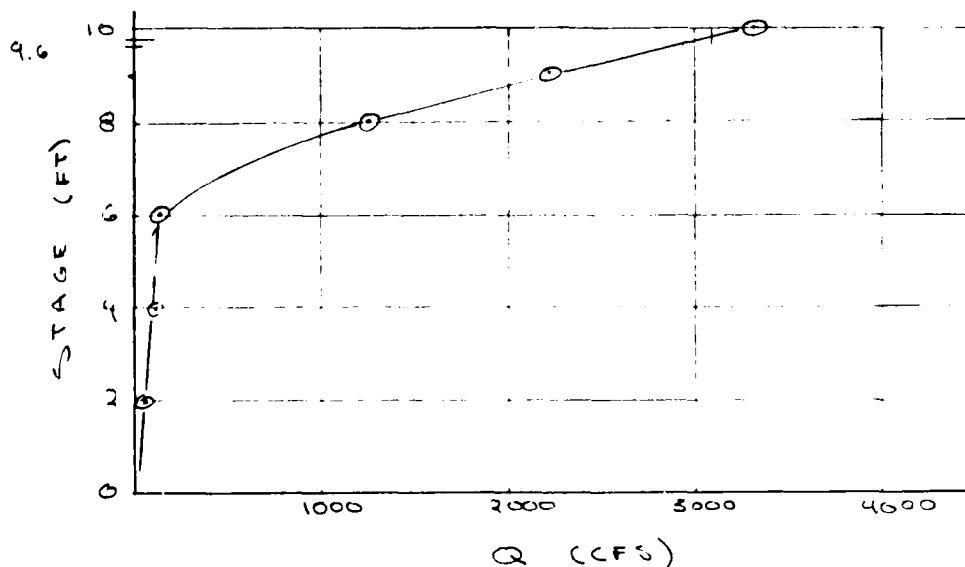


ASSUME ORIFICE FLOW THRU CULVERT +
WIER FLOW OVER ROAD

$$Q_{\text{cul}} = CA\sqrt{2gh} \quad C = 0.5 \quad A = 16 \text{ ft}^2$$

$$Q_{\text{road}} = CLH^{3/2} \quad C = 2.6 \quad L = 150'$$

STAGE	H_{cul}	Q_{cul}	H_{road}	Q_{road}	Q_{TOTAL}
2	1	64	-	-	64 CFS
4	3	110	-	-	110
6	5	140	-	-	140
8	7	170	2	1100	1270
9	8	180	3	2030	2210
10	9	190	4	3120	3310



Job No. 31061Project PATAGUANSET

Subject _____

Sheet 10 of 11Date 6/4/81By SF Ch'k. by _____

STORAGE REDUCTION IN REACH 1

$$L = 2500' \quad A = 1100' @ \text{STAGE} = 8.2'$$

$$\text{STOR} = \frac{2500 \times 1100}{43560} = 63 \text{ AC-FT}$$

$$Q_{P2} = \left(1 - \frac{63}{1200}\right) 3100 = 2940 \text{ CFS}$$

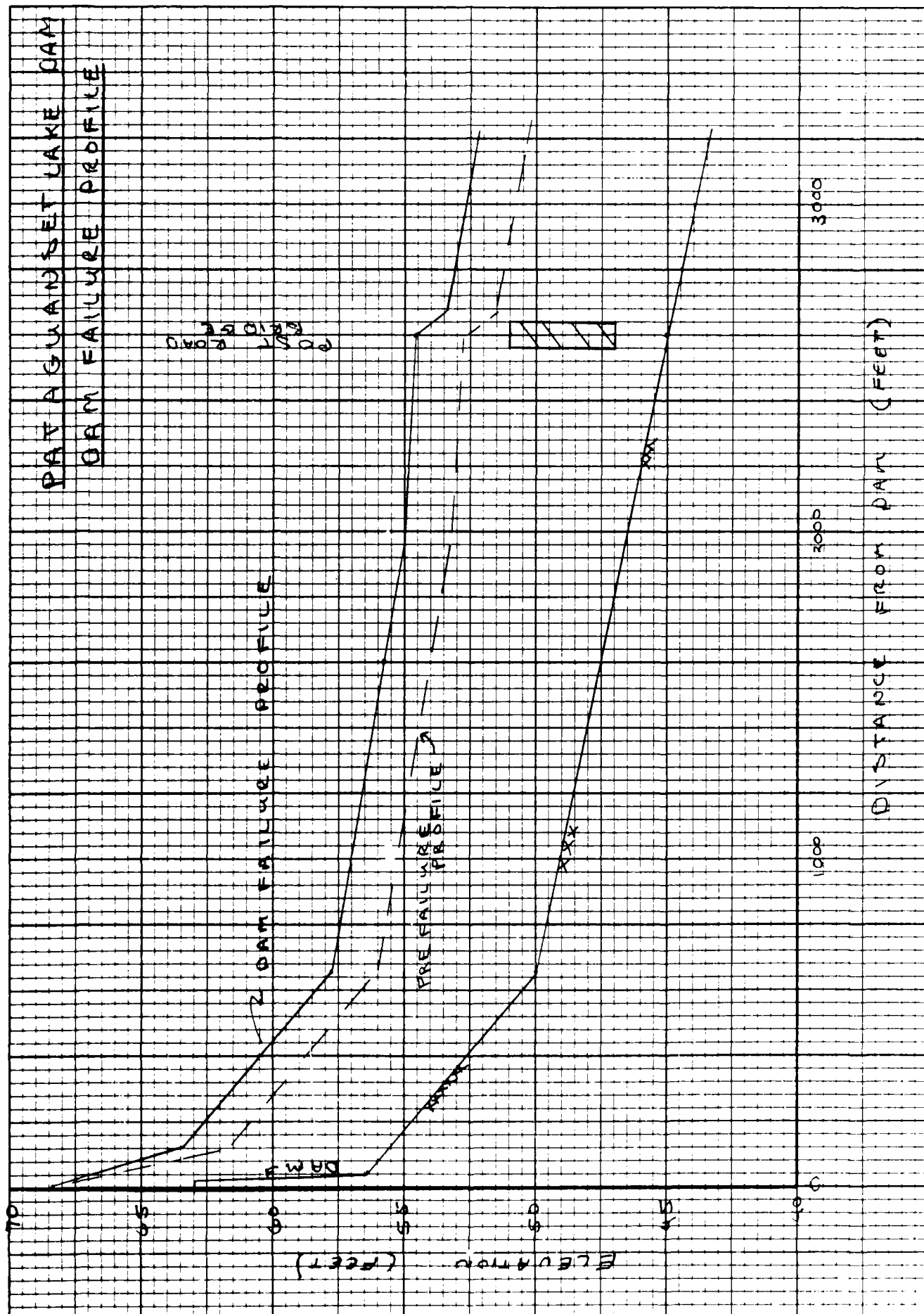
$$\text{STAGE} = 8.2'$$

∴ 5% REDUCTION IN FLOOD FLOWS
DUE TO REACH STORAGE AND A 0.1' FT
DROP IN FLOOD STAGES

REACHES BELOW THE BOSTON POST ROAD ARE
NOT INHABITED OR DEVELOPED WITHIN THE
FLOOD AREA & HENCE NO DAMAGE WOULD
OCCUR.

SUMMARY

- 1) A DAM FAILURE DISCHARGE OF
3100 CFS WILL RAISE FLOOD LEVELS
APPROXIMATELY 2 FEET OVER
PREFAILURE FLOOD LEVELS.
- 2) DEPTH OF FLOODING IN THE TWO
DOWNSTREAM HOMES AFFECTED WILL
BE 1 TO 3 FEET. AND FLOOD DEPTH
OF THE BOSTON POST ROAD (U.S. ROUTE 1)
WILL BE 4 FEET DEEP.



APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL
INVENTORY OF DAMS

END

FILMED

8-84

DTIC